

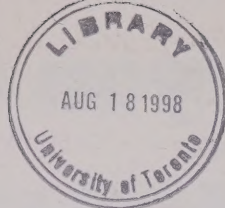


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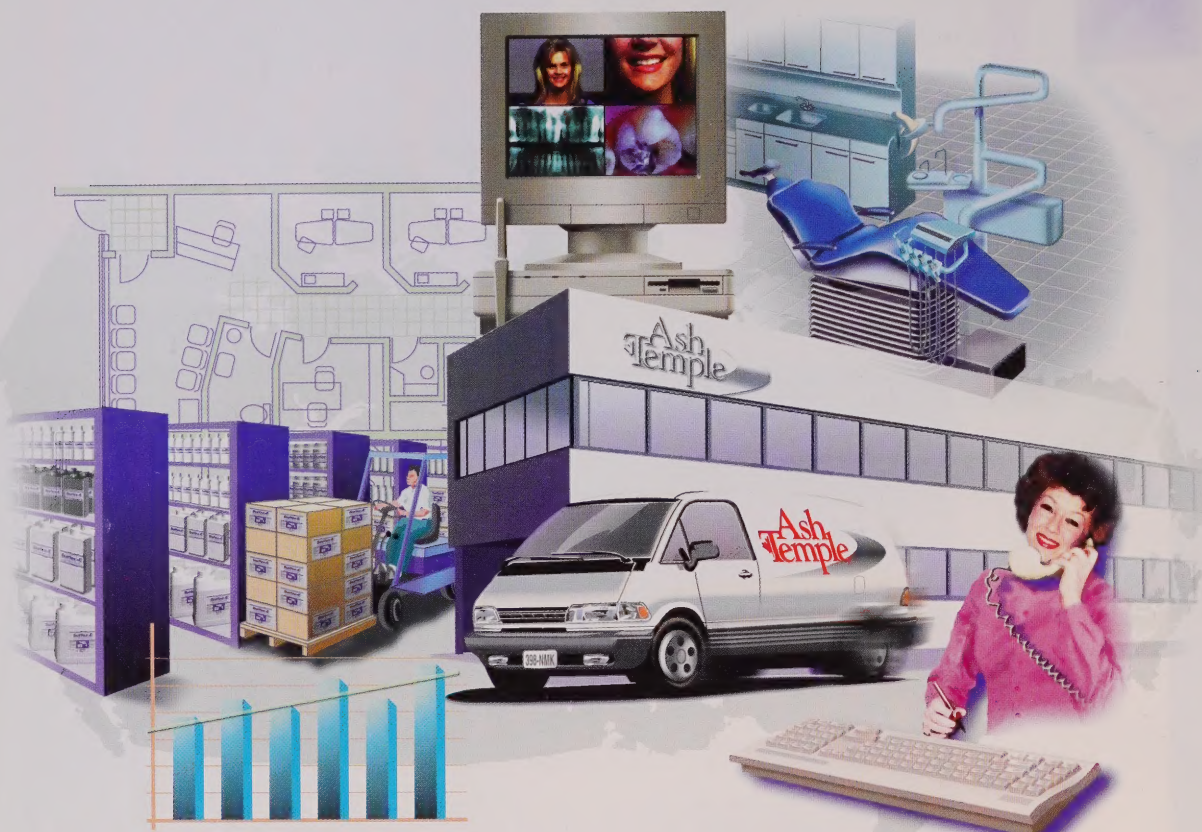
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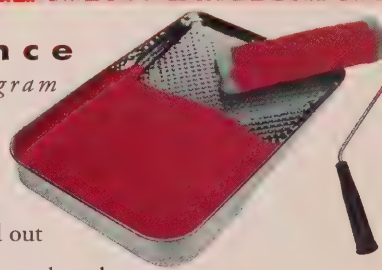
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The *Journal of the Canadian Dental Association* is published in both official languages — **except scientific articles which are published in the language in which they are received**. Readers may request the *Journal* in the language of their choice.

ISSN 0709 8936
PRINTED IN CANADA



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a watercolor
painting
by Dr. Toby
Gushue.



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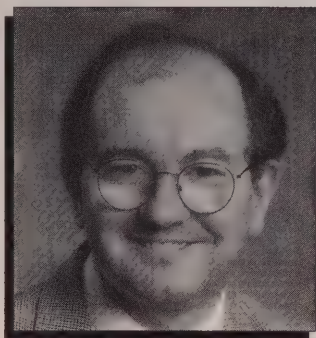
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EDITORIAL

TURNING THE ELEPHANT



Dr. John P. O'Keefe

A few weeks ago I received a very gratifying, yet amusing, e-mail message from a dentist. My correspondent told me that he had been reading my editorials with interest, and that he appreciated my opening moves with regard to the remake of the *Journal*, as well as my "appeal to the dental community to move with me." He went on to caution me, however, that "the remaking of an elephant (large, entrenched, given to ponderous movements, thick skinned and therefore impervious to all but the most forceful broadsides) is a delicate task."

During this first year as editor, I have often wrestled with a dilemma: whether to move fast in making changes to the *Journal*, or to proceed slowly. My enthusiasm for developing the publication, and my admiration for the flexibility of commercial publications, makes me impatient for change. However, I am conscious that the *Journal* has a mandate that is different from the profit-orientated mandate of commercial magazines, and that we have a very important tradition to uphold. I don't want to fall into the trap of "throwing out the baby with the bath water."

Ottawa is a place where people have to live and work with ambiguity. My position is no different. To borrow a political

metaphor, the editor of the *Journal* must be both a progressive and a conservative at the same time. When I joined the organization, I made a commitment to seek ways to improve the *Journal*, and to make changes as I found better ways of doing business.

Before making wholesale changes, however, I felt it was very important to get to know you, your concerns, and your needs with regard to the *Journal*. Since January, I have focused on getting out of my office to meet with practitioners, academics and members of the dental industry. The idea behind these outreach activities is to create my own network of people, get them to become actively involved with the *Journal*, and use their collective talents to ensure its continued development. My success or failure as editor depends on getting a large number of Canadian dentists to write articles, review manuscripts and suggest improvements.

This year, I met and spoke to many practitioners by attending dental conventions in Winnipeg, Vancouver, Toronto, Montreal, Yarmouth, and St. Johns. I also visited over half the dental schools in Canada, and discussed the *Journal* with deans, faculty members and students. And at every opportunity, I met exhibitors at the dental trade shows. If the welcome I have received to date can be taken as a yardstick, there is a lot of goodwill in our community for the *Journal*.

In a sense, I have been walking around the elephant, admiring its tusks, tweaking its tail, and appreciating its size and weight. I feel that I have been getting a good sense of what changes are desired and needed to develop the *Journal* as Canada's premier dental publication. But I need your input. Over the next few months, we will be formally polling you for your views on how the *Journal* is developing and how you want it to change. The data we receive will be used to make noticeable changes in the publication between now and the end of this year.

At the beginning of June, staff presented CDA's communications

and membership committee with an interim report on the future of CDA publications. A number of options, ranging from conservative "micro level" changes to radical "macro level" changes, were put forward for consideration at that meeting. For a number of important reasons, however, the committee endorsed a prudent approach for the next year.

This approach will involve: maintaining the frequency of publication and range of distribution of the *Journal*, making the publication look more pleasing and easier to read, overhauling the peer review process, and putting new names on the list of editors involved with the publication. Essentially, the committee said it is time to turn and guide the elephant, rather than cut off its trunk.

In order to make the *Journal* more responsive to the needs of Canadian dentists, I have set up a network of e-mail contacts around the country. I have asked representatives from local dental societies, provincial associations, regulatory authorities, dental schools and specialty associations to enter into regular correspondence with me. This way, I can get a better sense of the clinical topics that need to be discussed in the *Journal*, and of the news items and issues we should follow up on. I can also get regular feedback about how we are doing as we develop the *Journal*. This contact network has started small, but I am sure it will grow as more groups nominate representatives.

A number of dentists have commented to me that they can see the changes that have been introduced to the *Journal* over the past few months. Others tell me that it feels as if it is somehow becoming more "accessible." I have found this feedback encouraging. Please continue to send in letters, opinion pieces, and articles.

Have a great summer!

John P. O'Keefe
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PRESIDENT'S COLUMN

THE FUTURE OF SELF-REGULATION



Dr. Toby Gushue

As dentists, we take pride in the fact that we belong to a self-regulating profession.

So we should. Self regulation provides our profession and its members with unique privileges. If we are going to keep those privileges in the future, however, we must recognize that self-regulation is not an entitlement. It has been granted to us by society, along with certain responsibilities. Essentially, society has allowed organized dentistry to regulate itself and govern the practice of our profession. In return, society expects organized dentistry to exercise the leadership necessary to ensure that the members of our profession serve and protect the public. As dentists, we must assume the responsibilities that come with self-regulation freely and voluntarily.

Travelling throughout Canada over the last year, I began to ask myself, "Who are the dental profession's self-regulators?" Most of the dentists in attendance at the provincial association and regional society meetings I took part in had graduated more than 15 years ago. I continuously asked myself, "Where are the younger members of this profession?"

As a society, we keep hearing that the current generation of

young adults in North America are more greedy and selfish than the young adults of previous generations. This is reflected in the apparent reluctance of the younger members of our society, including members of the dental profession, to get involved in community service and volunteer organizations.

The lack of service by young members of the dental profession may simply be a reflection of their generation's attitude, or it may be that until now we have not provided them with a realistic opportunity to serve.

CDA's equitable representation program, which is designed to increase the number of young practitioners serving on committees at the national level, is certainly a step in the right direction. To date, the response to this program has been very positive.

The other factor in the voluntarism equation may be the type of individuals that we are admitting into our profession. More than once, I have asked myself if the emphasis our dental schools place on high grade point averages is resulting in a failure to select well-rounded, responsible individuals for admission into dentistry.

The relationship of our profession to the society we serve is ever changing. As society evolves, the profession must also change and develop if it is to continue to be effective. This creates an interesting dilemma. If individual dentists are not attending dental association and/or society meetings, are they really aware of the changing needs of society or the changes occurring within our profession? Likewise, if dentists do not participate in meetings, exchange viewpoints, and vote on the issues presented, how can dentistry's leaders be confident that our chosen courses of action are in the best interest of the profession and society?

Unfortunately, the values held by some members of our profession seem to be shifting. Professional collegiality and respect are diminishing more and more each year, only to be replaced by self interest.

Not too very long ago, it was considered inappropriate conduct to take patients from your col-

leagues. Today there is a greater competition for patients, and there seems to be no reluctance to seize any opportunity to solicit patients from any source. Similarly, it was once considered taboo to hire staff away from a colleague's office. Today, little or no concern is given to the inconvenience and costs involved for a colleague to recruit and train new staff when an employee has been lured away and has to be replaced.

Where we once believed that health care professionals had a responsibility to provide care for a reasonable fee, today an increasing number of continuing education courses encourage dentists to maximize fees and profits. These courses would not be offered if dentists were not willingly paying to attend them.

The practice of dentistry involves a somewhat artificial environment in comparison to many other work settings. Within the walls of their offices, dentists create a professional world of their own, which is limited to their office staff and the patients who seek treatment there. It can be easy to become lost in that world, and forget about the broader needs of our society. As professionals, however, we should extend our realm of interests and influence to our entire community as well as to our profession.

If the dental profession is to maintain its integrity and the confidence of society, and continue to provide a high standard of oral health care, every one of its members must be involved in its leadership at the local, provincial or national level. Both established dentists and recent graduates must be aware of society's changing needs, recognize the factors that are influencing changes in public attitudes, and be knowledgeable concerning the approaches that the dental profession is taking in response to these changes.

If there comes a time when a majority of dental professionals do not recognize these responsibilities, we could very well be looking at the demise of dentistry as a self-regulating profession.

*Toby Gushue, BA (Ed.), BA, DDS
President of the
Canadian Dental Association*

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LETTERS



Editor's Comment

The opinions of readers about the content of the Journal and issues related to the profession of dentistry are a vital component of this publication. Some correspondents have so much to say that their letters tend to be rather long. Such letters would be more suitably published as opinion pieces, under the heading "It's My Opinion."

I welcome both types of submission from readers. In the future, I ask that letters to the editor be no more than 300 words long. A letter of this length should allow the correspondent to make one succinct point well. Longer opinion pieces (up to 1,200 words), relating to the major issues facing our profession, are especially welcomed from readers and will be considered for publication as stand-alone opinion pieces.

Please don't hesitate to call me to discuss the opinions you would like to share with your colleagues. I am delighted to help busy practitioners get their thoughts on paper. It's your Journal!

Part-Time Clinical Instructors

I can't think of a more appropriate author to have written an article on part-time clinical instructors than Dr. Lorne Chapnick (Chapnick, L. and Chapnick A. The Part-Time Clinical Instructor In the Undergraduate Dental Clinic. *J Can Dent Assoc* 64(5):374-375, 1998).

Dr. Chapnick was my part-time clinical instructor in the endodontic undergraduate clinic, and he was the best. He always displayed patience and positive feedback in

a warm and supportive environment. No matter how poorly your "tugback" was, he always made you feel good about yourself.

On a personal note, I was involved in an assault, which resulted in my right central incisor being knocked out of its socket. I called Dr. Chapnick, and he attended to my emergency situation at 1:00 a.m. on a Friday night. What a professional and true gentleman.

Ed Pollack, DDS
Toronto, Ont.

Biased Research

In its May 1998 issue, the Journal published the abstracts of two dental materials articles by Drs. M. Suzuki and D. Davidson (Suzuki M. and Davidson D. A 4 Year Clinical Evaluation Of Zirconium Silica Contained Composite Resin Placed On the Posterior Dentition; Davidson, D. & Suzuki, M. A Long-Term Clinical Evaluation Of A Heavy Filled Hybrid Composite Resin As a Posterior Restoration. [Abstracts Of Oral and Poster Presentations Made By Canadian Researchers At the AADR/CADR Meeting, Minneapolis 1998] *J Can Dent Assoc* 64(5):383-385, 1998).

Drs. Suzuki and Davidson's research was funded by the companies who manufactured the materials evaluated in their studies, namely Z-100 (manufactured by 3M of St. Paul, Minn.) and Prisma TPH (manufactured by Dentsply Caulk).

How biased are their results considering the amount of money that the manufacturers provided to fund this research? Wouldn't the results be more accurate if money that was independent from the manufacturers had funded their studies?

M. Lazare, DDS
Comox, B.C.

Editor's Note

It is customary for authors of papers or abstracts to acknowledge the source(s) of their research funding. In an era where private funding seems to be becoming the norm, I would be more wary of

authors who don't make such an acknowledgment.

Private funding of research is a fact of life that our Journal has to live with. We have therefore adopted a policy whereby all authors of scientific and clinical articles are asked to sign a "declaration of financial interest" form on submission of a manuscript. Authors are asked to declare if they have any financial interest in the firms that manufacture the products mentioned in their article. They are also asked to declare if they have any relationship with competitor firms. If authors declare such an interest, it is editorial policy to disclose that interest at the end of the article. I believe that this sort of disclosure allows our readers to decide if funding from a particular source alters the validity or importance of an article.

Paraformaldehyde-Containing Paste In Endodontic Therapy

Canadian dentists who practice and teach pediatric dentistry should be aware that the Royal College of Dental Surgeons of Ontario (RCDSO) have finally determined "that the use of paraformaldehyde-containing paste or material in endodontic therapy is not a standard of practice in this province and therefore such material should not be used" (*Dispatch* 12:15, 1998).

We have expressed our concerns¹ and developed an alternative treatment² to the formocresol pulpotomy that continues to be the norm for treatment of vital pulp exposures in North American children. Although Lewis³ recently emphasized the dangers of toxicity, mutagenicity and potential carcinogenicity of aldehyde compounds in the blood vascular system, we feel the chances of producing a sensitivity to formaldehyde compounds is more likely.⁴

The position of the RCDSO should stimulate all Canadian dental undergraduate teaching

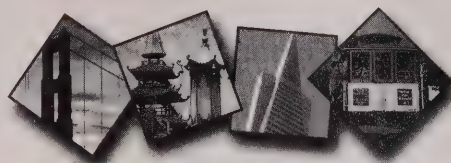
programs to re-evaluate the use of formaldehyde compounds such as Buckley's formocresol with children. I am pleased that this initiative came from the RCDSO rather than being forced on us by an increasingly aware public.

Currently, the best alternatives to formocresol pulpotomy are zinc oxide-eugenol root canal treatment and ferric sulfate pulpotomy. The results of a study on ferric sulfate pulpotomy, conducted in Israel, were recently published.⁵ The University of Western Ontario's School of Dentistry has adopted both ferric sulfate pulpotomy and zinc oxide eugenol root canal treatment for vital pulp exposures, and the University of Toronto teaches vital root canal treatment as an alternative to formocresol pulpotomy. We have just received approval from The Hospital for Sick Children for a two-year study entitled: A prospective longitudinal outcome study to compare the ferric sulfate pulpotomy technique with the zinc oxide-eugenol root canal treatment for vital primary molars. There is currently no North American outcome study of the ferric sulfate technique, but the study of Fuks et al⁵ indicates that it provides a second alternative to the use of formocresol in the pulps of primary teeth.

David J. Kenny, B.Sc., DDS, PhD
Director, Dental Research and Graduate Studies
Professor of Dentistry
University of Toronto
Toronto, Ont.

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NEWS UPDATE



CDA's director of practice management support services, Mr. James Gagnon, addresses the dentists and dental team members who attended the panel discussion on CDAnet.

CDAnet Panel Discussion Draws Large Crowd

It was standing room only when CDA conducted a panel discussion for dentists and their staff who use the CDAnet electronic claims transmission system.

Held during the recent ODA/CDA 1998 National Convention in Toronto, the panel discussion brought together representatives from the two main networks processing CDAnet-transmitted claims, Assure Health Inc. and the National Data Corporation, as well as representatives from the insurance carriers and CDAnet, to provide participants with an overview of the system and answer their questions.

The panel discussion also gave dentists and their staff an opportunity to inform the networks, insurance carriers and CDA about the problems they have experienced with the CDAnet system, and seek solutions.

"It really provided a forum for a two-way exchange of information," said Mr. James Gagnon, CDA's director of practice management support services. "We learned a lot about how the system is working in the field, we got some valuable ideas on how it could be improved, and we were able to resolve some of the problems that individual dental teams brought forward. This was

definitely a win-win experience for everyone who attended."

CDA plans to hold similar information sessions in major cities across Canada. The next confirmed event will be held in Ottawa on October 21. There is no cost to register for this information session, but space is limited, so please register early. For more information, please contact CDA's CDAnet staff at 1-800-267-9701. ■

Students Conference Adopts New Format

To foster a greater understanding of CDA, organized dentistry, and the dental profession, CDA tried a new format for its annual Canadian Dental Students' Conference this year.

Members of both the senior and junior committees on student affairs attended the event, which had previously only been attended by junior committee members.

During the conference, speakers representing all facets of dentistry, including CDA, the Dentistry Canada Fund (DCF), and Canadian Dental Service Plans Inc. (CDSPI) informed participants about what to expect when they graduate and who they can turn to for help. Participants were also encouraged to promote CDA membership at their respective schools.

The two-day conference was followed by a joint business meeting between the junior and senior committees, which also conducted a joint business meeting with CDA's sub-committee on new dentists.



Members of the junior and senior CDA committees on student affairs (CSA) and the sub-committee on new dentists held a joint business meeting in June (standing l to r): Dr. Kent Orlando (past CSA chair), Cheri Porth (U.B.C.), Natali Schindler (McGill), Kim-Anh Nguyen (Montreal), Terence Vandiver (American Student Dental Association), Jean-Sébastien Renaud (Laval), Phil Love (Alberta), Les Kalman (U.W.O.), Stéfán Piché (Sask.), James Stephenson (Sask.), Dr. Sylvie Renoir (sub-committee on new dentists), Dr. Jocelyn Pearce (chair, sub-committee on new dentists); Dr. Garry Lunn (executive council liaison). Sitting (l to r): Craig Smith (Dalhousie), Dr. Jack Gardner (past student governor), Andrew Kay (CSA chair, U of T), Debbie Saunders (student governor, Manitoba), Samantha Koch (Manitoba), Fawzia Ahmed (U.W.O.), Souzi Mhanna (McGill), and Cindee Dupuis (U.B.C.).



"Back From Fishing", a watercolor painting by Dr. Toby Gushue.

Cover Artist: Dr. Toby Gushue

The painting on the cover of the *Journal* is a watercolor by CDA president Dr. Toby Gushue. Although painting is more of a hobby than a vocation for the St. John's, Newfoundland, dentist, he has enjoyed some commercial success. Prints of his work are sold by galleries in St. John's, and one of his original watercolors is hanging in the boardroom at CDA's Ottawa headquarters. ■

Topics of discussion included the new dentists program held annually during the CDA Convention, the continuation of CDA's dentists helping dentists mentorship program, the need for mandatory instruction in practice management, jurisprudence and ethics to be added to the curricula of Canadian dental schools, starting a practice management forum on the CDA Web site, and the merits of mandatory CDA membership for all dentists. ■

Sponsorship Announcement Welcome

Air Canada's recent decision to become the principal sponsor of the Formula One Canadian Grand Prix next year is winning high praise from both the federal government and health organizations such as CDA.

"Air Canada has sent a strong signal to cultural and sporting groups that they do not need tobacco sponsorship money to survive," said CDA president Dr. Toby Gushue. "By doing so, they have broken the tobacco companies' traditional stranglehold on the sponsorship of cultural and sporting events, and provided Health Minister Allan Rock with the ammunition he needs to fully implement the recent amendments to the Canadian Tobacco Act."

In June, Health Minister Allan Rock introduced amendments to the Tobacco Act that will phase out tobacco company promotions related to the sponsorship of sporting and cultural events over the next five years.

The amendments will let unrestricted tobacco company sponsorship-related promotions continue for two years. At that point,

all off-site promotions will be banned, with the exception of direct mailings to an identified adult, promotions that appear in publications with a primarily adult readership, and promotions in bars and taverns that minors cannot legally enter. On-site promotions will be allowed for three additional years, however, before a total ban is imposed on tobacco company sponsorship-related promotions.

Mr. Rock introduced the amendments to provide the organizers of events and activities sponsored by tobacco companies with ample time to find new sources of funding.

"Air Canada's decision confirms that Canada's corporate community recognizes the value of associating their companies with noteworthy sports and cultural events....," said Mr. Rock in a

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June 18 news release. "Today's announcement should send a strong signal of encouragement about the willingness of non-tobacco companies to step forward and associate themselves with sponsored events. I hope that event organizers will use the transition period to identify and work with alternate sponsors."

CDA supports tougher regulations to control the marketing and sale of tobacco products, but believes that Mr. Rock's amendments fall well short of the mark.

"Curbing the leading cause of preventable death and disease deserves stronger action. CDA supports tougher measures to control tobacco use, including plain packaging, greater funding of public education, and a public enquiry into the tactics of the tobacco industry," said Dr. Elizabeth MacSween, a member of CDA's steering committee on government relations, and its representative on the National Steering Committee for a National Tobacco Strategy. ■

RIC Renews Call For Coordinated Approach to Pension Reform

Members of the Retirement Income Coalition (RIC), including CDA, met with senior government officials May 29 to reiterate their opposition to the piecemeal reform of the Canadian retirement income system.

RIC, a broadbased coalition of health care organizations, seniors groups, real estate associations and chambers of commerce, wants Finance Minister Paul Martin to put his plans for a new seniors benefit on hold until he has considered the impact of the proposal on the entire retirement income system.

Mr. Martin has already changed the Canada Pension Plan, which is widely recognized as one of the three main pillars of Canada's retirement income system. The other two pillars are the Old Age Security (OAS) system and Guaranteed Income Supplement (GIS); and registered retirement saving plans (RRSPs) and registered pension plans (RPPs).

NHL Goalie Promotes Preventive Dental Care

Buffalo Sabres' goalie Dominik Hasek has signed a deal with Ivoclar North America Inc. to promote preventive dental care and the benefits of pit and fissure sealants.

Mr. Hasek is appearing in an advertising campaign based on the theme "Shut Out Tooth Decay" to increase consumer awareness of sealant therapy and promote this type of preventive dental care.

According to Ivoclar, only 17 per cent of eight-year-old children in the United States have been treated with dental sealants, which it believes can significantly reduce the threat of dental decay. ■

If the seniors benefit goes ahead, it will replace the OAS and GIS. So far, however, the finance minister has not announced any plans to change the current regulations regarding tax-free private savings held in RRSPs and RPPs.

CDA and the other members of RIC are continuing to push for coordinated changes to the retirement income system, which would include increased annual contribution limits for RRSPs.

"The ideal situation would be to go back and look at the retire-

ment income system in its totality and how the various pieces fit together," said Mr. Charlie Pielsticker, a Toronto insurance broker and RIC spokesperson.

Many groups, including CDA, are also concerned that unless Mr. Martin makes significant changes to his proposed seniors benefit, it will act as a disincentive for Canadians to save for their retirement years.

The problem stems from Mr. Martin's plan to clawback the seniors benefit from families with

average to above average incomes. Under the proposed system, families with incomes above \$78,000 will receive no benefits.

A RIC position paper on the seniors benefit, which was sent to Mr. Martin this spring, states: "Income tested programs discourage retirement savings and self reliance. Universal programs do not. For this reason, income tested programs must be designed with great care. They must be coordinated with other income tested programs at both the federal and provincial levels and they must be coordinated with our progressive income tax system. Otherwise the disincentives compound to the point where those who save are penalized for having done so.

"The combination of heavy tax and clawback rates on low-income earners is a major problem that arises under the proposed structure."

Another bone of contention is Mr. Martin's decision to base the seniors benefit on family income rather than individual income.

CDA and several other members of RIC support the family income approach, because they believe that the seniors benefit should be targeted to the individuals with the greatest need. However, a number of other organizations in the coalition, including many seniors groups, believe this approach will unfairly discriminate against married couples.

In April, CDA wrote to Mr. Martin to clarify its position on the seniors benefit.

"CDA does not support the manner in which the seniors benefit was first proposed," said CDA president Dr. Toby Gushue. "We continue to believe that the seniors benefit should not penalize average Canadians who plan for their retirement and save through RRSPs. At the same time..., CDA believes that if the OAS and GIS are amalgamated, the new program should be targeted to those individuals most in need. If one spouse has a substantial retirement income and the other spouse has none, we do not believe that

the spouse that has none should be considered in need."

However, CDA fully supports RIC's position that if the seniors benefit is implemented as it is currently proposed, it should be phased in slowly; the difference in the amount of benefit available to individuals who turn 65 one year and those who turn 65 the next year should be small; and the 20 per cent clawback rate should be reduced to no more than 10 per cent.

As a result of CDA and RIC's concerns, Mr. Martin and his officials have promised to review all aspects of the proposed seniors benefit. ■

Saskatchewan Student Takes Top Place In Student Clinician Program

A dental student from the University of Saskatchewan earned the first-place award in the 28th annual CDA/Dentsply Student Clinician Program.



Mr. James Stephenson of the University of Saskatchewan earned the first-place award in the 1998 CDA/Dentsply Student Clinician Program.

Mr. James Stephenson of the University of Saskatchewan won the award for his table clinic titled Computer-Assisted Learning (CAL) and Mandibular Nerve Anesthesia. Second place went to Mr. Davide DiGiovanni for his clinic, Evaluation Of Dental Unit Waterline Contamination.

The program, held in conjunction with the ODA/CDA 1998 National Convention in Toronto, May 7-9, was made possible through a special grant made by

Dentsply Canada Ltd. to the Dentistry Canada Fund (DCF).

Students who place first in the student clinician program at their school are eligible to participate in the national program. Nine students from across Canada took part in the event this year.

For winning the first-place award, Mr. Stephenson will be invited to attend the 139th annual session of the American Dental Association Oct. 24-28 in San Francisco as an honored guest of Dentsply International. Mr. DiGiovanni received a \$500 cash award.

All participants were invited to attend a special awards dinner at the conclusion of this year's program.

Under the definition established by CDA's council on education, a table clinic is a tabletop demonstration of a technique or procedure concerned with some phase of research, diagnosis or treatment as related to the profession of dentistry. ■

CAOMR Celebrates 25th Anniversary

The Canadian Academy of Oral and Maxillofacial Radiology (CAOMR) and the specialty it represents in Canada both turned 25 this year.

CAOMR was founded in October 1973, the same month and year that CDA's board of governors granted specialty status to oral radiology.

The process was initiated in 1972 by Dr. Alex Ruprecht, who was a recent graduate of the University of Toronto's (U of T) oral radiology program at the time.

Acting on the request of Dr. Coleman Reed Tuckson, then the president of the American Academy of Dental Radiology, Dr. Ruprecht undertook a survey to assess the status of oral radiology in Canada. He subsequently shared his survey report with Dr. H. Guy Poyton, the chairman of oral radiology at U of T, who suggested that it contained all the information needed to apply to CDA for recognition of oral radiology as a dental specialty.

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Dr. Ruprecht then wrote to the dentists across Canada who identified themselves as oral radiologists to gauge the support for the creation of a national academy.

Following an overwhelming favorable response, an organizational meeting was held in Toronto in January 1973. Dr. Poyton was elected founding president of the new organization, named the Canadian Academy of Oral Radiology, and Dr. Ruprecht the founding secretary.

In 1996, to reflect the changes that have occurred in its specialty over the last quarter century, the academy changed its name to Canadian Academy of Oral and Maxillofacial Radiology. ■

CPhA Releases 2nd Edition Of Therapeutic Choices

The Canadian Pharmacists Association (CPhA) has released a 2nd edition of *Therapeutic Choices*.

Extensively updated and expanded, the new edition contains 11 new chapters on topics ranging from chronic fatigue syndrome, drug withdrawal syndromes, HIV infection, herpes virus infection, burns, and neuralgia.

CPhA describes *Therapeutic Choices* as being an authoritative source of vital information on options in therapy, and the latest addition to the extensive list of drug and health information resources available from the association, which also publishes the *Compendium of Pharmaceuticals and Specialties*.

"Using *Therapeutic Choices* is like having a distinguished team of medial and pharmacy practitioners and instructors personally consulting on your patients' treatment needs," said Dr. Jean Gray, the publication's editor-in-chief.

For more information, dentists should contact Renée Couturier at 1-800-917-9489, ext. 205. ■

Alberta and Toronto Students Win ASGD Awards

Three dental students from the University of Alberta shared third prize in the American Society For Geriatric Dentistry's (ASGD) annual Student Essay Awards Contest

recently, and a Toronto public health graduate student finished second.

Darcey Burnett, Carmen Todd and Geeta Verma, all junior dental students from the University of Alberta, won the \$200 third prize in the ASGD's Arthur Elfenbaum Essay Award Contest for their discussion of design and function considerations for elders in the dental office, while Dr. Robert Hawkins, a public health graduate student from the University of Toronto, won the \$500 second prize in the Saul Kamen Scientific Report Contest.

Sponsored by Procter and Gamble Oral Care, ASGD's essay writing contests are open to U.S. and Canadian dental and dental hygiene students. The contests are intended to stimulate interest in geriatric oral health care among dental professionals.

The Arthur Elfenbaum Essay Award is presented to the student who submits the best scholarly essay discussing a health care concept, health care policy or clinical issue concerning geriatric dentistry, while the Saul Kamen Scientific Report Award is given for the best report of an original study concerning a geriatric oral health issue.

For more information, students should contact Dr. Kenneth Shay, Essay Award Committee Chair, Dental Service (160), Ann Arbor DVA Medical Centre, 2215 Fuller Rd., Ann Arbor, MI 48105. ■

Hu-Friedy Issues Product Advisory

Hu-Friedy is advising dentists to discontinue using resin Advantouch instruments.

In a product advisory dated May 28, the company states: "...In 1996 we introduced a new line of resin handled products (cream color) called Advantouch. These instruments were well received by the dental profession and by all accounts were a success story.

Subsequent to our pre-launch testing, we have received a very small number of reports of the Advantouch handles snapping during usage, probably caused by combined factors of finger pressure, thermal stress, chemicals or

other unknown variables in dental practice. Any possibility of snapping is unacceptable to us, as we are sure it is to you.

This product advisory is to inform you to discontinue use of all of your resin Advantouch instruments and return them to us.

This decision is based on the concept that currently available resin based polymer materials are not sufficiently robust enough to meet our highest standards of safety and performance.

In the coming weeks your dealer representative will provide you with appropriate mailing materials to return the instruments directly to Hu-Friedy. Upon return we will replace your instruments with stainless steel handled instruments at no charge...If you have any questions, please call us at 1-800-729-3743, ext. 4321. ■

Medical Association Seeks Donations

Dentists and physicians in Armenia desperately need supplies, equipment and financial support, says a provincial non-profit organization.

"The devastating results of the 1998 earthquake, the subsequent collapse of the Soviet regime, and the ongoing economic blockade have pushed the health care system in Armenia beyond its limits," said the Armenian Canadian Medical Association Of Ontario. "Although there is no shortage of health care professionals, there is a shortage of equipment and supplies."

The organization is seeking volunteers willing to work as visiting dentists or dental assistants in Armenia, as well as donations of supplies, equipment, or any other form of support. It is currently establishing a dental clinic in Shoushi, a town of 5,000 inhabitants that now has no access to dental care. The clinic will provide free dental services, and focus on preventive dentistry for children.

For more information, dentists should contact Dr. Vic Derderian, 1700 Wilson Ave., North York, ON M3L 1B2; tel. (416) 244-4969. ■

Ottawa-Carleton's 1998 Adult Oral Health Program Focuses On Oral Cancer

In response to a recent survey showing that Ottawa-Carleton residents are largely unaware of the causes of oral cancer, the region's health department has made oral cancer the focus of its 1998 adult oral health program.

As part of the program, the Regional Municipality of Ottawa-Carleton (RMOC) Health Department has joined forces with the Canadian Cancer Society to develop an oral cancer newsletter and self-test.

This spring, the RMOC Health Department consulted with local dentists on the new materials. Both the newsletter and self-test received enthusiastic approval from the dentists participating in the consultation session, who also recommended distributing them to their colleagues across Canada with the *Journal*.

Following a request by the RMOC Health Department, CDA has therefore reproduced the materials, which are included with this issue of the *Journal*. The RMOC invites dentists to photocopy the newsletter and self-test, and distribute them to their patients. ■

DIAC Survey Winners Announced

Eleven lucky dentists who completed the Dental Industry Association of Canada (DIAC) 1998 survey will be travelling less expensively in the near future.

Dr. Judy Mah of Edmonton, Alta., won the draw for a \$1,000 first-prize travel voucher, while Drs. Catherine Sims (Bradford, Ont.), A.T. Nowakowski (Winnipeg, Man.), C. Chruszez (Toronto, Ont.), H.L. Goldberg (North Bay, Ont.), Chris Bryant (Sooke, B.C.), Nairi Kalanian (Montreal, Que.), Dorothy Wong (St. Albert, Alta.), H.D. Anderson (Halifax, N.S.), Alexander Bickerton (Sydney, N.S.), and Jelte Heerema (London, Ont.) each won consolation prizes of \$100 travel vouchers.

The DIAC survey, published in the April 1998 issue of the *Journal*, sought the opinions of Canadian dentists on the current and future course of dentistry. ■

Appointments

Laval Appoints New Program Director



Dr. Pierre-Éric Landry

Dr. Pierre-Éric Landry has been appointed director of the University of Laval's oral and maxillofacial surgery program. He is a 1976 graduate of the University of Montreal's dental program, and received his certificate in oral and maxillofacial surgery from the University of Laval in 1983. ■

Obituary

Dr. Earl Freeman Dexter

A dentist known for his generosity, compassion, years of service to his profession and good humor has died.

Dr. Earl Freeman Dexter died at his home in Halifax May 24. He was 72.

A graduate of Dalhousie's dental program, Dr. Dexter practised with his twin brother Carl for 44 years. He was a past-president of the Halifax County Dental Society, Nova Scotia Dental Association (NDSA), Nova Scotia Dental Board, and Nova Scotia Dental Technicians Board of Examiners. He was also the founder and first chairman of the NDSA's peer review program, and a life member of CDA.

Donations may be made to the Heart and Stroke Foundation of Nova Scotia, Dalhousie Dental Memorial Scholarship Fund, or the First Baptist Church Memorial Fund. ■

Erratum

The name of a co-author of an article published in the June issue of the *Journal* was spelt incorrectly. The correct list of authors for the article, A Review Of Common Dental Treatments During Pregnancy: Implications For Patients and Dental Personnel (*J Can Dent Assoc* 64:434-439, 1998), is: L. Wasylo, D. Matsui, S.M. Dykxhoorn, M.J. Rieder, and S. Weinberger. The *Journal* regrets the error. ■

Ash Temple Limited Appointment



Mr. William L. Tingley

Mr. M.A. Hart, Chairman of the Board and CEO, announces the appointment of William L. Tingley as Corporate Vice-President responsible for company operations in Atlantic Canada.

Upon completion of community college in 1970, Bill began his services to dentistry as a student representative at Dalhousie University for Unident. He also worked for Dental Depot (now Patterson) before joining Ash Temple in 1983 as Branch Manager for Nova Scotia and Prince Edward Island.

His high personal standards, leadership and on-going quest for excellence has earned him the trust of an increasing number of dentists in Atlantic Canada as well as Ash Temple Manager of the Year Honours four times.

Bill and Sue, his wife of 28 years, reside in Bedford, where he is a member of the Rotary Club and a licensed realtor. He credits a great deal of his success to the staff at Ash Temple who consistently strive to provide the most professional services to the dental community.

**Ash
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INFORMATION PACKAGE

CDA Resource Centre Packages for July-Aug. 1998

The packages contain a selection of reading materials on IMPLANT-SUPPORTED DENTAL PROSTHESIS AND THE DENTAL TEAM. They are available to CDA members for \$5.00 plus applicable tax.

A complete list of information packages is available upon request by calling 1-800-267-6354 or can be easily accessed on the CDA web site at www.cda-adc.ca. Once inside our site, please log into the "CDA Members" area and click on "Resource Centre" and a list of packages can be viewed.

New Acquisitions

Bertold, P. Mark and Narayanan, A. Sampath. *Biology of the periodontal connective tissue*. Quintessence, 1998.

Burt, Brian A. and Eklund, Stephen A. *Dentistry, dental practice and the community*, 4th ed. Saunders, 1992.

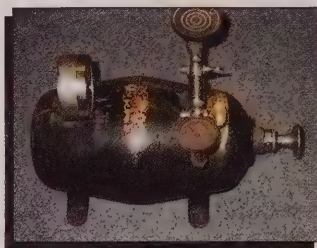
Brons, Rijnko. *Facial harmony: standards for orthognathic surgery and orthodontics*, Quintessence, 1998.

Bennett, Jeffrey and Taylor, Thomas A. [editors] *Dental implants. Dental Clinics of North America*. Saunders, 1998.

Vandersall, David C. [editor] *Advances in periodontics, part I. Dental Clinics of North America*. Saunders, Apr. 1998.

Dym, Harry and Dembo, Jeffrey, B. *Cutaneous & mucous membrane lesions of the head and neck: diagnosis and management. Oral and Maxillofacial Surgery Clinics of North America*. Saunders, Feb. 1998.

Marciani, Robert D. *Implant failures. Oral and Maxillofacial Surgery Clinics of North America*. Saunders, May, 1998.



"What's It?"

The Dentistry Canada Museum has received an identification for the "What's It" item that appeared in the October 1997 issue of the *Journal*. Dr. Anne Dale, the curator of the University of Toronto's museum, has informed the museum that the item is a Ransom and Randolph "pig" — one of the first vacuum casting devices developed in the 1920s. The museum is also very grateful to Dr. Dale for sending us literature outlining the evolution of metal casting in dentistry. This information provides an excellent insight into how far dentistry has advanced since Dr. Edward Hudson of Philadelphia cast the first denture in 1820, by lading low fusing alloys into moulds.

If you have a dental article that needs identification, please contact Dr. Ralph Crawford, c/o the Dentistry Canada Museum, 427 Gilmour St., Ottawa, ON K2P 0R5.



This month's "What's It?" are a pair of metal frames that are about 10 cm in length, with movable jaws at one end. Our guess is that they have something to do with establishing centric relation, but we would be glad to hear from anyone with first-hand knowledge of the manufacturer, brand name, and actual use of these frames.

If you can offer some insight into this month's mystery items, please contact Dr. Ralph Crawford, c/o the Dentistry Canada Museum, 427 Gilmour St., Ottawa, ON K2P 0R5. ■



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Settle for Less



When you lease your car instead of buying, you settle for less.

Less money spent on your car payments because the monthly lease payment can be several hundreds of dollars less than a loan payment.

Leasing means *less* hassle too. If you like a new car every few years, why bother always negotiating with dealerships and arranging car loans?

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The Canadian Dental Auto Leasing Program

CDSPI, in cooperation with AT&T Capital

Canada, operates the Canadian Dental Auto Leasing Program for dental professionals and their immediate family.

This program gives you more competitive lease rates than you're likely to find elsewhere. Also available to you is the choice of any make and model, very flexible lease terms, and knowledgeable consultants who will help satisfy your leasing requirements.

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Disability Claim Review Shows There's No Claims Crisis

Earlier in the year, without providing evidence to support its allegations, a dental trade publication declared that hundreds of dentists covered under the Canadian Dentists' Insurance Program's long-term disability plan were experiencing problems with their disability claims. The publication also stated that CDSPI "did nothing to assist any of these individuals."

CDSPI's internal claims figures, which are based on claims surveys, indicated just the opposite. Our claims surveys showed that very few disability claimants have experienced problems and that our claims department staff have routinely assisted claimants in various ways. It therefore seemed clear to us that the publication's allegation of a claims crisis was spurious.

Nonetheless, since CDSPI always tries to ensure that participants in the Canadian Dentists' Insurance Program are well served, we decided to investigate the accusation further. The results of this investigation are now in — there is definitely no claims crisis. This fact will come as no surprise to the majority of dentists who have had legitimate disability claims under the program.

Claims Review Offered

As we have mentioned in several previous articles on disability insurance, regulations concerning the confidentiality of medical and

financial information generally prevent CDSPI from becoming directly involved in the claim process. (The same limitation applies to any third party — including insurance brokers — for any disability plan. Unless the claimant agrees to share his or her medical and financial information with a third-party such as CDSPI, these facts cannot be disclosed by the insurance carrier).

As part of our investigation, CDSPI submitted a confidentiality release form for publication in the same magazine that made the allegations against the Canadian Dentists' Insurance Program's long-term disability plan. Dentists were advised that if they were experiencing difficulties with a claim they had made under the plan, and they signed and returned the form to CDSPI, we would review their claim files with Sun Life of Canada (the plan insurer).

We did *not* receive an avalanche of forms from the alleged hundreds of claimants with problems. Far from it. In fact, only eight dentists returned signed release forms requesting that we look into their claim files. Representatives from CDSPI then met with Sun Life's senior claims personnel, as well as with its medical and financial experts, to review the eight files.

As a result of this review, CDSPI is pleased to be able to inform the dental profession that both their

LTD plan and their premium dollars are being properly managed in relation to the disability claims being paid out under the Canadian Dentists' Insurance Program.

In all of the cases we investigated, claims were being adjudicated under the terms of the disability contract. In seven of the eight claims reviewed, it was CDSPI's opinion that the conclusions reached by the claims adjudicator and the final claim disposition were totally appropriate, based on the terms of the contract as well as the medical and financial circumstances represented by the documents contained in the file. In one claim situation, it was recommended that the insurer meet with the claimant and negotiate a cash settlement to bring the claim to a close. This action has been taken, to the complete satisfaction of the claimant.

The results of CDSPI's investigation were consistent with our statistics on past claims, which show that the vast majority of disability claims filed are legitimate, under the terms of the contract for the Canadian Dentists' Insurance Program's LTD plan, and are paid. From 1994 through 1997, the annual percentage of unpaid claims (300 plus claims are made each year) ranged from seven to 13 per cent.

It is important to note that the single largest reason that claims were not paid was simply that the disability ended during the

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elimination period selected by the insured dentist. Other reasons for rejecting a claim included: no loss of income, a request by the claimant that the claim not proceed, and outstanding information requirements. On an annual basis, only one to three per cent of claims were rejected due to a lack of medical proof of disability. This amounts to just 31 claims over the four years, out of the nearly 1,300 claims received.

Claims Process To Be Enhanced

From our review of the eight files, CDSPI saw up close how very careful Sun Life's claims adjudication process is. We saw how the claims process progresses, as well as the documentation required to evaluate a claim situation, determine the status of the disability, the extent of income loss, and the validity and authenticity of the actual claim. We also witnessed the extensive case management process used by Sun Life to review the claims, and the broad expertise of the individuals who manage the large sums of money required to deal with disability insurance.

Though the current system is fair, thorough and efficient, based

on the conclusions we reached during our review of the eight claims, CDSPI made several recommendations to Sun Life on how to further improve the process. Sun Life concurred with these recommendations, and has either implemented them or is in the process of doing so in order to provide claimants with an even higher level of service.

First, we recommended improving communication between the claimant and the claims adjudicator. Now, more frequent contact, both by telephone and by letter, will take place so that the claimant stays well informed and up-to-date about his or her claim status.

Second, Sun Life agreed to our suggestion that there should be more communication between their medical experts and the medical professionals working directly with the claimant. In other words, during case management, the physician used by Sun on a particular claim should communicate directly with the physician of the claimant to facilitate a clear two-way flow of information at an equal level of expertise. This would also apply when psychiatrists, psychologists, occupational therapists, etc. are involved.

As the claimant relies heavily on the advice of his or her own

medical representative, it is important for this representative to know the position of the insurer from a medical standpoint, and for the insurer to learn as much as possible first hand about the claimant's situation. Some of this data cannot be as clearly communicated on paper. Sun Life is working on putting a process for direct communication into place, which will assist the claimant during the claim process.

As well, Sun Life has agreed to work with CDSPI in developing a process for final appeal if a claim is denied and a claimant wishes one last review. As this will not be a binding arbitration process, the development of such a mechanism will take time. However, we are confident that a process can and will be developed to provide the claimant with an opportunity for a final review of their claim situation.

Disability Plan Fair To All Participants

CDSPI, acting as the administrator of the Canadian Dentists's Insurance Program's LTD plan on behalf of CDA and the provincial co-sponsors, is very pleased with the results of the review exercise. In our view, it has proved that the claims management of this plan adheres to the terms of the contract, is fair to claimants, and protects the money of dentists who pay premiums into the group plan to ensure their financial security at time of disability. We also believe that the review has allowed us to improve the system for future claimants. CDSPI will continue to work with Sun Life to make sure that the high claims management standards of this triple A insurer are maintained.

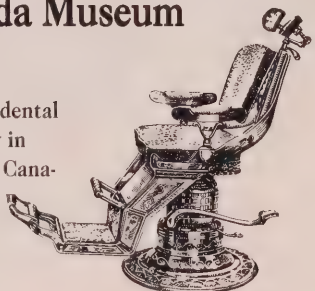
As mentioned earlier, CDSPI's actions are restricted by the confidentiality rules related to disability claims. However, we still urge anyone experiencing a claim difficulty with Sun Life to contact us. We will work with the insurer on your behalf to keep the avenues of communication open and the information flowing in order to bring your claim to a conclusion. CDSPI continues to be dedicated to making sure that all legitimate claims are paid and that the contract is used correctly by both claimants and the insurer. ■



Dentistry Canada Museum

Donations Requested

Memorabilia from our rich dental heritage are now on display in the Resource Centre at the Canadian Dental Association headquarters and the Dentistry Canada Museum in downtown Ottawa.



Donations of museum quality dental artifacts and documents are being accepted and are very much appreciated. Items of value may be eligible for tax receipts.

For further information on how you may participate in contributing to our rich dental history, contact Dr. Ralph Craxford, Dentistry Canada Museum, 427 Gilmour St., Ottawa, ON K2P 0R5, (613) 236-4763, fax (613) 236-3935.



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CDA Fund Performance[†] (for period ending June 30, 1998)

CDA GROWTH FUNDS	1 year	3 years	5 years	10 years
Canadian				
Aggressive Equity Fund (Altamira)	5.9%	15.8%	n/a	n/a
Common Stock Fund (Altamira)	9.3%	10.2%	8.7%	8.8%
Canadian Equity Fund (Trimark) ^{††}	1.4%	12.8%	12.2%	11.7%
Special Equity Fund (KBSH)*	15.0%	33.0%	26.2%	n/a
International**				
Emerging Markets Fund (KBSH)	-35.8%	-12.5%	n/a	n/a
European Fund (KBSH)	37.6%	25.4%	n/a	n/a
International Equity Fund (KBSH)	3.6%	12.0%	n/a	n/a
Pacific Basin Fund (KBSH)	-24.9%	0.5%	n/a	n/a
US Equity Fund (KBSH)*	24.3%	24.3%	20.4%	17.6%
Global Fund (Trimark) ^{††}	7.4%	15.4%	18.0%	16.2%
CDA INCOME FUND				
Bond & Mortgage Fund (Canagex)	7.3%	9.3%	8.5%	10.1%
CDA CASH AND EQUIVALENT FUND				
Money Market Fund (Canagex)	3.5%	4.3%	4.7%	7.1%
CDA GROWTH AND INCOME FUND				
Balanced Fund (KBSH)	9.2%	14.2%	11.4%	10.4%

[†] CDA figures indicate annual compound rate of return with all fees deducted. The figures are historical rates based on past performance and are not necessarily indicative of future performance.

^{††} The rates of return shown for the Canadian Equity Fund (Trimark) and the Global Fund (Trimark) are based on the returns of the Trimark Canadian Fund and the Trimark Fund respectively, the mutual funds in which those CDA funds invest. Returns are historical and are after deduction of management fees. As a result, the performance results differ from those published by Trimark Investment Management Inc.

* Historical figures shown are those for Knight, Bain, Seath & Holbrook's Special Equity Fund and US Equity Fund in which the CDA funds invest, after removal of management fees.

** These funds are subject to foreign content limitation.

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Journal

July-Aug.
1998
Vol. 64
No. 7

The Truth About Fee Guides

Donald L. Rife, DDS

Based on my more than 46 years of experience with the modern-day fee guide, I have found myself in the difficult position of disagreeing with an eminent authority such as Dr. David Schwab (Schwab, D. Dentistry After The Fee Guide. *J Can Dent Assoc* 64:321-322, 1998).

However, having had much to do with the fee guide since 1952, I greatly resent the inaccuracies, untruths and inexactitudes that are sprinkled so liberally throughout Dr. Schwab's recent article.

The basic concept of the article is summed up in the statement: "As dentists in Alberta and across Canada prepare to practice dentistry in the next millennium, they would all be well advised to have the courage to put aside impediments to free enterprise, such as the fee guide, and to let their practices soar to new heights."

This statement is misleading at best, because the fee guide is definitely not an impediment to free enterprise.

Dentists in Alberta and the rest of Canada avail themselves of a fee guide as a matter of convenience. It was designed to be, and is usually used as, a means of recording usual and customary services that fall within very limited parameters. As such, it neither imposes requirements on dentists, nor demands anything of them. It is a neutral document, a guide,

Canadian dentistry's procedure codes were and are carefully crafted to ensure that they incorporate the full range of dental services and procedures, as well as the variants thereof, performed by dentists.

This listing was initially prepared to counter the unseemly demands of dental prepayment (indemnity) plan carriers, in the era of key punch cards and written claim forms, when each carrier had its own system of numerically listing services and its own individually designed claim form. The chaos in dental offices back then, as would be the case today without the Uniform System of Codes and List of Services (USC&LS), was unbearable.

Carefully calculated time and responsibility factors, which denoted averages obtained from extensive surveys of dental offices, were subsequently used to develop a fee guide based on the same basic format as the list of codes and services.

Dental prepayment plan carriers had already assembled a multiplicity of similar lists. Based on their guestimates of the time and levels of responsibility involved, they had also established fees for the listed services, which they used to create their own reimbursement payment schedules. The implication was that the fees contained in these schedules were what dental services were really worth, and therefore what dentists should receive for provid-

ing those services. The plans the carriers sold to their clients were based on this premise.

Dr. Schwab has seemingly failed to understand that the same commercially created, plan-carrier produced reimbursement schedules that plagued dentistry before the creation of the USC&LS are the real culprits in this discussion, not the profession's carefully created fee guides.

From the beginning, dental associations recognized that the plan carrier's reimbursement schedules were out of touch with reality, and were designed only to suggest that company "A" provided "reimbursement" for more services for less premium money than company "B". Co-payment factors, deductibles, etc., were carefully screened in small print to further confuse plan purchasers and holders, who rarely appreciated their total impact.

However, many plan purchasers and holders were persuaded that the fees quoted in the carrier's reimbursement schedule were what dentists should be charging for their services, with the result that many heated in-office discussions occurred over the fact that the dentist's fees were considerably higher than those quoted by the plan carrier. The fact that the carriers were only selling prepayment plans for profit, while

dentists had to face the cold economics of practice, was ignored.

Dentistry responded by adding a cost of practice monitor factor to its carefully calculated time and responsibility factors. The new factor was also determined by conducting wide surveys of dental practices to establish the relationship between dentist's fees and dentist's net income. Conversion factors, modified annually to reflect changing costs, were a part of this process.

This ultimately led to the creation of provincial suggested fee guides. These guides, as well as the associated prepayment documents (international tooth codes, claim forms, predetermination forms, etc.), were subsequently transposed into computer format, and today form the components of a modern business system that has become essential to successful dental practise.

Dr. Schwab states that the fee guide "provided a level of security to dentists by removing the anxiety associated with setting and explaining fees to an increasingly value conscious public..." It did no such thing. Instead, it provided each dentist with a means to evaluate their true office costs and establish their own office fee guide. It was and is a reference document for each individual dentist. It is not a legal document. It is not binding on anyone. It is only a guide.

Dr. Schwab also states that the fee guide "effectively placed a cap on (dentists') earning power." Again, it did no such thing. Since dentists set their own office fees, they themselves determined their income level, and placed their own cap on income and earning power. Fees are a part of a contract between the patient and dentist, and are determined by agreement between these two parties.

The fee guide is a reference document designed to assist dentists in determining the monetary requirements of their individual practices, and to provide convenient codes (both tooth and service) to assist patients in receiving reimbursement from any indemnity plan in which they participate with a plan carrier and/or provider. Fees, based on the complexity of

the service, and the time, talent, and responsibility required to provide it, are the legal responsibility of the dentist to set and negotiate with the patient, whether patients have a dental plan or not. The suggested fee guide is only a guide.

One can only question the veracity of Dr. Schwab's belief that..."because the vast majority of dentists adhered strictly to the fee guide, they inadvertently ceded control of their practice profitability to third parties." No proof of such adherence is offered, nor is any evidence that legal action has been taken against any dentist or the dental profession because it is implied that a dentist or dentists charge identical fees for any particular procedure code, or because they supplied patients with claim forms and lists of services provided using identical fees. The relationship between adhering strictly to fee guide fees and ceding control of profitability is never explained, possibly because the fee guide, by definition, is only intended to be used as a guide. Dr. Schwab's statement is therefore purely opinion, and lacks credibility.

I also take issue with Dr. Schwab's view that "...following the fee guide allowed Alberta dentists to make a comfortable living..., flattened out the differences between dentists...", and ensured that "the best dentists earned no more...than their less skilled counterparts."

If this is true, then it is the individual dentist who is to blame, not the existence of a suggested fee guide. Simply put, if my skill and work are more valuable to a patient in my perception than someone else's, and I choose to depreciate that value to a common denominator, who is to blame? Certainly not a fee guide to which I have no legal or other obligation to adhere! The statement is untrue.

Dr. Schwab goes on to state that "The fee guide took shape in the 20th century at a time when the world was still trying to follow 19th-century business conventions. It was created in a clubby world of brandy snifters, fine cigars, and overstuffed chairs...Professionals...did not con-

sider themselves to be businessmen..." He also suggests that there was a "gentlemen's understanding...that a dentist avoided discussing fees with patients...", and would "not try to gain a competitive advantage..." and that most dentists had "enough patients to keep...busy all the time."

What spin doctor created this illusion of words? Certainly not any practising dentist in Canada in the last 50 years. What monstrous distortions of fact.

The first Canadian version of a fee guide originated in Ontario, and the Ontario Dental Association (ODA) deserves all the credit for being progressive, modern, and far seeing for its initial development and continual upgrading of this guide. It was never and is not a gentlemen's agreement to shelter dentists from competition. This point in particular had to be demonstrated to the satisfaction of both provincial and federal government officials, under the threat of a multi-million dollar lawsuit against the ODA and each individual member of its executive council. The fee guide was and is produced to their satisfaction.

In reality, the fee guide is a superb marketing tool that helps dentists cope with the complexity of determining office costs, service performance costs and, ultimately, the in-office fees they charge for services rendered.

Marketing in dentistry has always been aggressive. Perhaps the marketing approaches dentists use today are less subtle than they were formerly, it's hard to say, but there is no evidence that this change has been advantageous for anyone. Is our objective today only to make a lot of money? Or, do professionalism and responsibility to the patient still remain as viable concepts?

It costs more to sell things now than it did in the past, and market volume and/or quality is supposed to make the difference. Ultimately, the patient pays, and it is up to the patient to decide the value of the proffered services. If "differences in dental fees across

Alberta" have not "manifest(ed) themselves," then it is probable that the degree of competence and service provided by Alberta dentists is superb and has reached an economic plateau. Yet even if this is true, outstanding service will be rewarded commensurately. The relationship between the quality of service provided and the fee patients are willing to pay for that service cannot be attached to a fee guide. It remains a dentist's right to seek proper remuneration.

If "forward-looking" dentists are not setting their own office fee guides, then, says Dr. Schwab, they are acting illegally because there then must be some collusion involved. Think about it. If Alberta compiles and circulates a "provincial average" of fees, isn't it a form of fee guide? It sounds like re-inventing the wheel. Setting "lower than average fees" or higher than average fees has always been the dentist's right. In fact, it is a duty determined by circumstances and the treatment involved. If a dentist has failed to take a "market-based approach" to practice economics, then it is not the fee guide that was at fault.

Dr. Schwab's view that "A combination of clear communication with patients, attractive office decor, well trained staff and, of course, the ability to deliver excellent care and treatment... will allow certain dentists to "imbue the services they provide with enough perceived value that patients will pay a premium price," that "there are patients who will pay top dollar for what they consider to be high-quality treatment," and that "imagination and boundless self-confidence on the part of the entrepreneur push prices higher," simply states a reality that has always existed in dental practice. This is not new thinking. What is new is the use of the word "prices," which is supposed to be foreign to the concept of fee for service.

"The demise of the fee guide means that there is no longer a floor below which fees cannot fall..." and "there is also no longer

a ceiling beyond which fees cannot rise," says Dr. Schwab. This is totally untrue. There is not now, nor was there ever, a floor or a ceiling created by a fee guide below or above which fees could not pass. The determinant in this matter is pure raw economics. Individual dentists have total discretion to set office fees, based on international economics and what patients are willing to pay for dental care. Dentists have gone bankrupt and other dentists have prospered beyond all imagination. They have failed or succeeded based on their ability to communicate, to provide quality services, and to convince patients to pay a fair fee for those services. There is nothing new here, and nothing that relates to a fee guide. Plain old fashioned horse sense, maybe?

Any dentist with the dental qualifications of a Picasso, who failed to establish his or her own fee guide for services provided, certainly has no right to assign their personal shortcomings to the presence of a provincial suggested fee guide. Alternately, suppose that "free enterprise" had taken over the merchandising of Picasso's sketch, what pittance would have been left for him?

Approaching a millennium (on whatever date you choose), with trepidation that a fee guide is an impediment to free enterprise, certainly encourages the concept of transferring personal responsibility to someone or something else. What an illusion has been performed by the author. One should dedicate more rightful and imaginative concern to determining if his or her computer, and those of the banks, insurance companies and particularly dental plan administrators will crash at the stroke of midnight, December 31, 1998.

Thankfully, Dr. Schwab's article is just an opinion. ■

Dr. Donald L. Rife is a past-president of the Canadian Dental Association.

I'm doing some
housecleaning
in the back
of your mind...



Hi! It's me, your conscience. Between old phone numbers, song lyrics, and lame excuses, there's a lot of clean up to do!

But there are also great things back here. Look! A desire to help out a friend, a wish to give time to a worthy cause, the intention to help your community and your neighbours – and more!

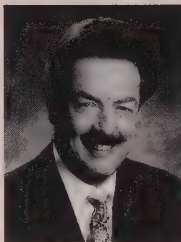
Let's move this stuff up to the front of your mind and use it to change the world. Helping causes we care about will be a breeze without all the clutter, so let's get to it!

Oh, and by the way, that little widget you can't find is in the back of your top dresser drawer...



Imagine is a national program to encourage giving and volunteering.

DENTAL BENEFITS ISSUES



Beware Of Still Waters

James Gagnon

During 1997, we wrote several articles about companies and organizations becoming involved in managed dental care plans, or with preferred provider networks. We also discussed the arrival of various types of management service organizations (MSOs), which are involved in the purchase and administration of dental offices.

Thanks to your constant support and vigilance, the dental profession has managed to limit the intrusion of these companies and their concepts to a minimum. In fact, a number of the groups that were active in the managed dental care area have left the Canadian market.

However, the companies and groups still promoting managed dental care in Canada have adopted new, soft-sell marketing techniques, or have remained virtually silent about the concept. This does not mean that they have given up trying to make managed dental care a reality in this country, however. Far from it.

All these companies have done is change their tactics. Instead of targeting dentists and major corporations, for example, they have made universities one of their favorite recruitment grounds. A number of managed dental care plans for students, which promote the concept of reduced fees and networks of preferred providers, started up during the 1997-98 academic year.

The insurance brokers and benefits consultants involved in managed dental care already have their sights set on other educational areas. Unions are also being avidly courted by these groups.

With increasing frequency, a number of the third parties involved in analyzing and paying dental claims are attempting to direct or influence the care you provide to your patients, generally under the guise of sound financial and claims management.

Other groups are setting up their own dental clinics and hiring dentists to manage them. The dentist provides care and treatment to individuals covered by the group's dental plan(s), and is paid in accordance with criteria determined by the group.

Still other groups are purchasing and managing dental practices outright. The business philosophy of many of these groups is to build networks of dental offices, in which the dentist simply provides care and no longer has any control over what goes on in the office.

Some of these companies, funded in part by some insurance companies, are attempting to create national networks of owned or affiliated dental offices, in which dentists are paid reduced fees (either lower fees in a fee-for-service system, capitation payments, or fixed salary) to treat patients in accordance with criteria established by the company. Professional and therapeutic freedom are sure to be dealt a blow if this occurs.

The best way of preventing these types of companies from gaining a foothold in Canada is to maintain your vigilance — seek legal, professional and practice management advice before you sign a contract with a third party, or agree to sell your practice — and stay informed. You must not hesitate to consult your colleagues or

the associations that represent you to discuss the strategy you should use and the questions you should ask if you are approached by one of these companies. If you remain isolated, as the firms concerned would like you to be, you can not take advantage of your colleagues' knowledge or advice, or share your knowledge with them, and you will not have all the relevant facts and information you need to make an informed decision.

It is time to stop being silent and start consulting with your profession. If an offer seems too good to be true, it probably is.

Isn't it better to practise your profession without outside constraints, based on your patients' needs, than to be bound to criteria established by a third party solely to reduce its costs and increase its profits, very often without the necessary regard for the quality of care to be provided?

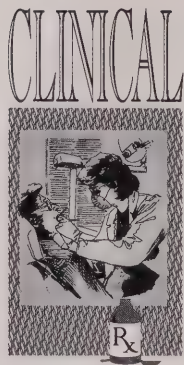
The lure and promise of financial gain that some companies are offering to dentists, and the cost savings the insurers involved in managed dental care are promising to employers, will continue to be major factors in the future. Clearly, the groups and companies involved are counting on these factors to sell their products and services. In response, the dental profession is counting on each of you to promote oral health, preserve the profession's therapeutic freedom and, above all, safeguard the dentist-patient relationship. ■

Mr. James Gagnon is CDA's director of practice management support services.

Journal

July-Aug.
1998
Vol. 64
No. 7

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Chronic Mandibular Dislocation: The Role Of Non-Surgical and Surgical Treatment

Marco F. Caminiti, B.Sc., DDS
Simon Weinberg, DDS, FRCD(C)

ABSTRACT

Although the management of acute dislocations of the temporomandibular joint (TMJ) has not changed significantly in recent years, chronic dislocations continue to be treated by a variety of methods. Long-standing cases are the most difficult and frustrating to manage. This paper reports on four cases demonstrating the signs and symptoms associated with some forms of chronic TMJ dislocations, and the difficulties encountered in the management of some of these conditions. An algorithm based on a critical review of the literature is proposed for the management of both acute and chronic TMJ conditions, and recommendations are made on how to eliminate or reduce their recurrence.

Introduction

Some confusion exists regarding the meaning of the terms subluxation and luxation, or true dislocation. A subluxation is a self-reducing, incomplete dislocation of a joint in which the patient is able to close his or her mouth without assistance.¹⁻⁴ Habitual subluxation is another frequently used term. It describes an often painful condition affecting normal joints, in which the condyle may be displaced anterior to the articular eminence of the temporal bone. This

condition is also self-reducing.^{5,6} When these subluxations are asymptomatic, they should be viewed as variants of normal.⁷

A true dislocation (or luxation) is a condition in which a joint is displaced from its articulations and requires manipulation by another individual to return to its normal position. Manual (closed) or surgical (open) manipulation may be required to reduce the dislocated condyle. These temporomandibular joint (TMJ) dislocations may be further subdivided into acute conditions and chronic recurrent or chronic persistent dislocations.

Subluxation and dislocation may be indistinguishable radiographically. In classic cases, the condylar position is anterior to the articular eminence when the mouth is opened wide. This radiographic observation is sometimes referred to as *elapsio prearticularis*, a term used to describe an obstructed, painless subluxation that ultimately reduces to a normal condyle-fossa relationship.^{3,6,8}

Studies show that the condyles' range of motion is variable, and not necessarily limited to the confines of the fossa. Ricketts found that 65 per cent of normal patients were able to subluxate their condyles.⁹ Another study on 100 normal patients noted that 85.3 per cent of their condyles

were either at or anterior to the eminence when their mouth was open to 35 mm.¹⁰ A significant difference in some cephalometric measurements as well as excessive sagittal condylar movements were seen when cephalograms were evaluated in both normal controls and patients with subluxation.¹¹ The height of the eminence has been shown to be higher in subluxated or dislocated joints than in normal controls, however.¹²

It is clear from the literature that there is no standard method of evaluating or treating these TMJ conditions. This is probably due to the high success rates achieved in the management of acute conditions, and the rarity of chronic conditions.

This paper describes four case reports of chronic TMJ dislocation, and proposes an algorithm for the management of these troublesome conditions.

Case 1

A 73-year-old woman was referred by her dentist for investigation of her abnormal bite. According to her interpreter, the malocclusion had been present for 10 years and had made her unable to chew properly. The woman was small and frail. Clinical examination revealed that she wore complete maxillary and mandibular dentures, which were maloccluded in posterior cross bite

resulting in moderate facial asymmetry. Panoramic radiographic examination showed a complete dislocation of the right TMJ (**Fig. 1**).

The patient was admitted to hospital, where closed reduction was attempted unsuccessfully under general anesthesia. The right TMJ was then exposed to direct vision using a traditional pre-auricular approach. It was observed that the mandibular condyle had developed a pseudoarticulation anterior to the articular eminence of the temporal bone, which was enveloped by dense fibrous connective tissue. The fibrous tissue was excised, the pseudoarticulation disengaged, and the condyle was reduced to its normal position in the glenoid fossa. Because of the patient's frail condition, maxillo-mandibular fixation (MMF) was not applied and a jaw supporting bandage was placed. When the patient was seen the following morning, the dislocation had recurred. The patient refused further treatment.

Case 2

A 16-year-old girl tripped and fell in a basketball game, striking the left side of her face against the team bench. In spite of the immediate facial asymmetry (**Fig. 2**) and abnormal bite that followed, the diagnosis of a dislocation was not made for two years. This was subsequently confirmed with panoramic radiography (**Fig. 3**).

Because of the chronic nature of this dislocation, it was felt that closed reduction would probably be unsuccessful. Preparations were therefore made for open reduction through a preauricular approach. However, after the induction of general anesthesia and deep muscle relaxation, the mandible was readily reduced by closed manipulation and the jaws were immobilized with MMF in centric occlusion for 14 days. At the two-month follow-up examination, the condition had not recurred.

Case 3

Chronic recurrent subluxation of the right TMJ was confirmed with panoramic radiography (**Fig. 4**) in a 77-year-old woman with a five-year history of this condition. The right

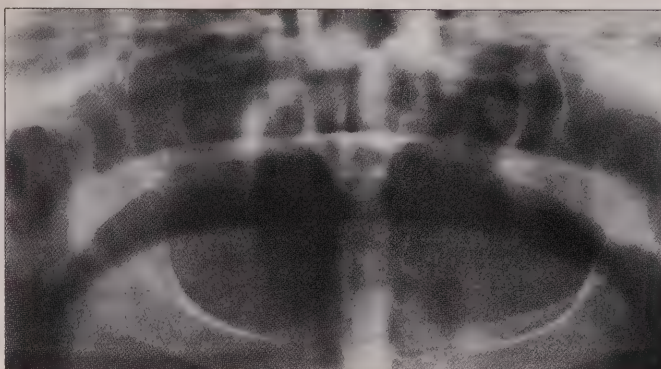


Fig. 1: Panoramic radiograph of a 10-year dislocated right condyle (**Case 1**).

condyle assumed a position anterior to the articular eminence each time the patient opened her mouth and remained in this position unless the patient "wiggled" and/or manipulated her mandible to achieve closure. Allegedly, the onset of the condition was spontaneous. There was no relevant history of precipitating factors such as trauma or the consumption of drugs with extrapyramidal effects.

The treatment plan presented to the patient included closed reduction with MMF for 14-21 days. If this proved unsuccessful, open reduction with eminectomy and MMF would be carried out. The patient refused any non-surgical or surgical treatment options, and has not been seen since her initial appointment.

Case 4

A 45-year-old woman who had fallen four months previously was unable to close her mouth since the accident. She had undergone several unsuccessful attempts to reduce her dislocation. Her past medical history was unremarkable.

On examination, an anterior open bite of 24 mm and a restricted range of mandibular motion were observed. The patient was partially edentulous. There was a notable preauricular depression in the region of both temporomandibular joint fossae. Panoramic radiograph revealed a bilateral TMJ dislocation. Transcranial radiographs were used to demonstrate the degree of dislocation (**Figs. 5a, b**).

The initial attempt at manual reduction was unsuccessful. Conse-

quently, local anesthetic was injected into one joint, around the capsule, and into the lateral pterygoid, temporalis, and masseter muscle insertions. Manual reduction was attempted again, but was unsuccessful. The contralateral side was then anesthetized, but further attempts at reduction were not successful. The patient was then sedated with demerol and diazepam, but reduction was still not obtained. Under general anesthesia with deep muscle relaxation, further attempts at closed reduction using considerable force were undertaken without success. Finally, the right TMJ was surgically explored via a preauricular incision, and the glenoid fossa, zygomatic arch and temporal fossa were exposed. Using bone hooks and Bristow elevators, followed by eminectomy and fossa debridement, unsuccessful attempts were made to torque the condyle back into place. The left side was then approached in a similar sequence. Lastly, arch bars were placed and, with a combination of maxillo-mandibular traction and bilateral manipulation with hooks and elevators, the condyles were reduced into their normal position. MMF was maintained for five weeks and at the one-year follow-up exam the patient was symptom free.

Non-Surgical Management Of Mandibular Dislocations

TMJ dislocations occur frequently as a result of protracted dental procedures, blows or trauma to the mandible,

bronchoscopy,¹³ anesthetic procedures,^{14,15} yawning,¹⁶⁻¹⁸ and drug induced¹⁹⁻²¹ or psychiatric conditions.²² The best treatment is immediate, effective reduction. Protracted and multiple attempts make further manual reductions more difficult, as the patient experiences more pain and further muscular spasm occurs. Hippocrates first described manual reduction in the fourth century B.C.²³ Ambroise Pare (1633) described the use of an object that would act as a wedge in the molar regions as the chin is elevated. In this way, the condyles are lifted off their locked position.⁴ The approach to the acute dislocation is outlined in **Table I**.

Chronic or long-standing dislocations that have persisted for more than one month are difficult to reduce manually. In a review study, Gottlieb²⁴ found that only three of 24 long-standing cases were successfully reduced by manual manipulation. Another review from 1949 to 1976 reported that four out of 24 cases of long-standing dislocations were successfully reduced manually.²⁵ Manual reduction using the hippocratic method and a mouth gag, inserted between the molars under general anesthesia, has proven to be successful.²⁶ Manual reduction of prolonged dislocations, up to 16 months, has also been described.²⁷ One case involved passing a wire through the inferior aspect of the mandible to aid in posterior distraction.

A variety of conservative surgical techniques have been described for reducing dislocations, including the use of a bone hook passed over the sigmoid notch⁴ or inserted into bur holes placed at the angles.²⁸ A Bristow elevator placed through a temporal incision can be used to apply posterior pressure to the anterior aspect of the condyle, which may force it to move posteriorly.²⁹ A unique approach has been reported by Rao, who reduced a chronic mandibular dislocation using archbars and posterior bite splints with strong anterior wiring and Class III vector for the posterior wires.¹⁶ Anterior and inferior mandibular traction applied with a hook in the sigmoid notch has been described



Fig. 2: Photograph of patient in **Case 2**, demonstrating facial asymmetry produced by the dislocation of the left TMJ.

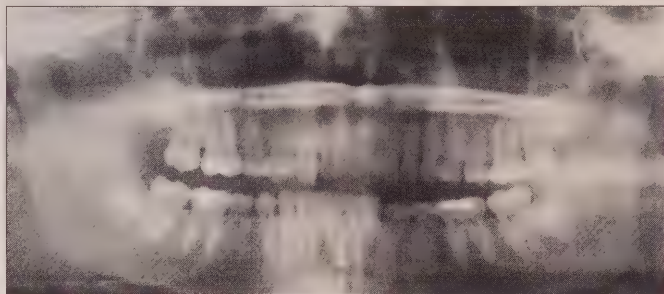


Fig. 3: Panoramic radiograph of a 16-year-old girl two years after dislocating her left condyle (**Case 2**).



Fig. 4: Panoramic radiograph of a 77-year-old woman with a five-year history of a right TMJ dislocation (**Case 3**).

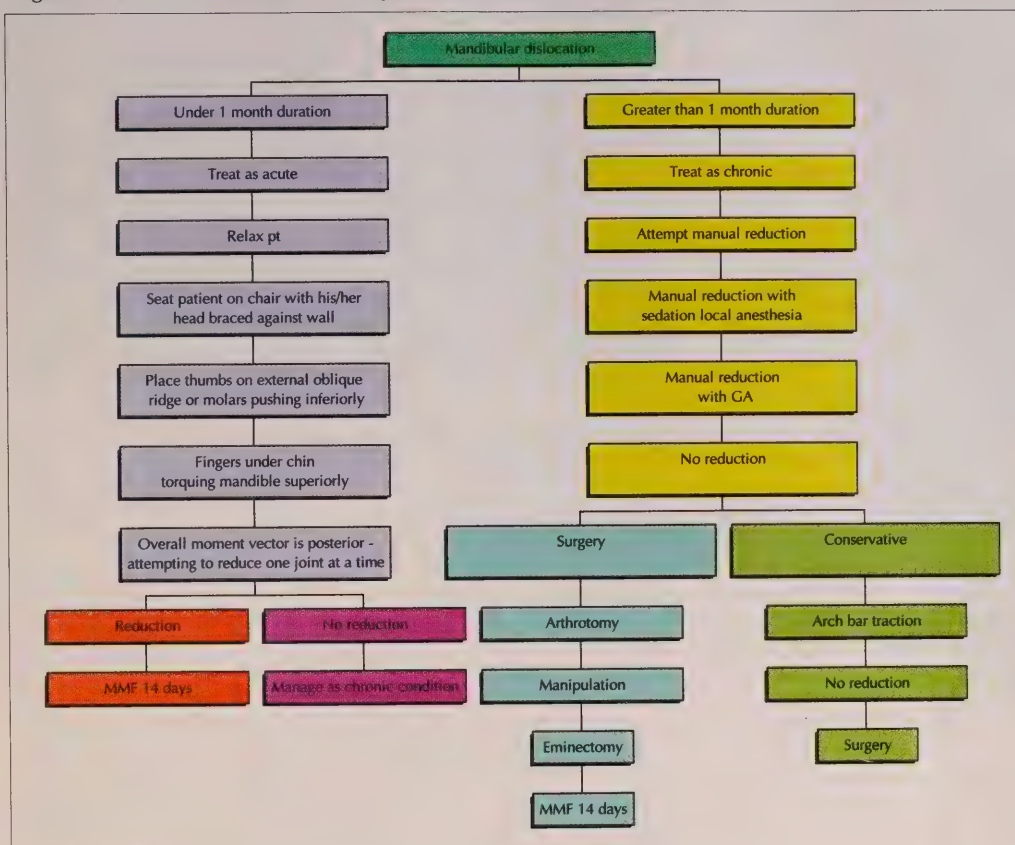
in the Japanese literature.³⁰

Adekeye²⁵ reviewed 24 patients with long-standing dislocations of from one to 120 months in duration. Four were reduced manually, nine were reduced with open procedures, seven required condylo-

tomies, and four had myotomies or other traction procedures. Interestingly, this article makes no reference to the common surgical approaches used by Myrhaug, Irby, Leclerc, and Dautrey, but it does emphasize the difficulties

Table 1

Algorithm For the Treatment Of Temporomandibular Joint Dislocations



encountered in adequately reducing the condyle.

Another conservative treatment modality involves the injection of local anesthetic in long-standing dislocated joints. This appears to overcome the muscle spasm that is initiated by pain producing stimuli in the region of the joint, as the anesthetic disrupts the sensory side of pain or the muscle stretch reflexes.³¹ A report on a 54-year-old woman with a seven-week history of dislocation, who was treated with bilateral injection of 2.0 cc of prilocaine, indicated a successful reduction after 10 minutes once the jaw was manipulated. The jaws were not immobilized, but at six weeks post-op there was no pain or recurrence.³¹

Surgical Management

The surgical techniques can be

divided into two categories (Figs. 5):

1. Operations that limit the condylar path;
2. Operations that enhance the condylar path.

Various techniques have been proposed for the surgical management of TMJ, but the most common are eminectomy to free all condylar movements, as described by Myrhaug in 1951,¹ and the zygomatic arch inferior downfracture to limit the condylar path, as described by Leclerc in 1943³² and modified by Dautrey in 1975.²

Surgery That Limits the Condylar Path

Mayer, in 1933, was the first to report the displacement of the zygomatic arch (or a segment of it) in order to obstruct the condylar path.

This technique was improved

by Leclerc and Girard in 1943, by placing a thicker part of the zygoma into the path of the condyle.³² They performed a vertical osteotomy of the zygomatic arch and lowered the proximal segment, which then served as an obstacle to anterior condylar excursions. In 1964, Gosserez and Dautrey described a technique for the treatment of subluxations and dislocations, which involved a posterior-anterior slanting osteotomy of the eminence, and is now commonly used.³³ Successful reductions of dislocations and chronic subluxations have been reported following the use of this arch downfracturing technique.^{3,8,34,35} Other successful modifications of the Dautrey technique to treat mandibular dislocation have also been described.^{8,27,36}

The use of sclerosing solutions

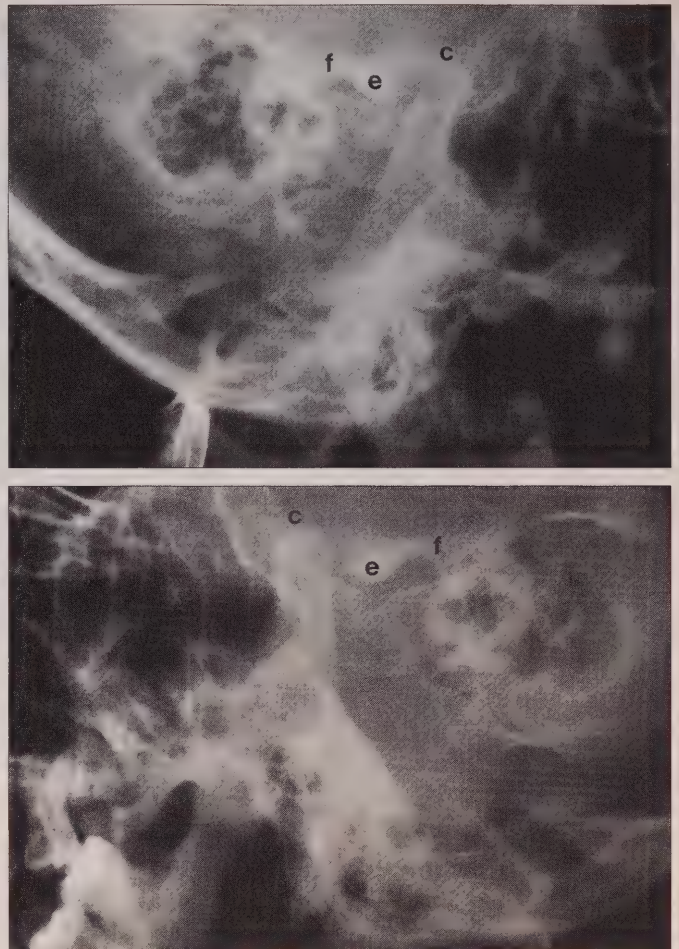
was first described by Schultze in 1947. Hypermobility was treated by injecting sodium psyllate into the periarticular tissues bilaterally to induce periarticular fibrosis and tightening of the joint.³⁸ Injecting 0.5 per cent sodium tetradecyl sulfate into the pericapsular area every two to six weeks to produce fibrosis and subsequent limitation in condylar movement has also been described.⁴ Some investigators have reported a 75 per cent success rate in treating chronic subluxations with sclerosing solutions.³⁹

Techniques that rely on a variety of bone plates to limit condylar translation have been used successfully by a number of surgeons.⁴⁰⁻⁴⁴ These techniques include the use of L-shaped stainless steel pins,⁴⁰ vitallium meshes,⁴¹ and condylar prostheses.⁴²

Myotomies have also been recommended in the treatment of dislocations.^{45,46} Laskin⁴⁵ describes a technique involving a myotomy of the temporalis muscle, performed through an intraoral incision, for the treatment of three patients with prolonged dislocations. He felt that these dislocations were prolonged due to the shortening of the temporalis muscle fibres, and that the liberation of these fibres would help reduce the dislocation. However, later results involving lateral pterygoid myotomy indicated that the use of silastic sheeting as an interpositional material did not prevent lateral pterygoid muscle reattachment, because the fibres reattached to the pseudocapsule formed around the material.⁴ Refinements in myotomy techniques have also been reported, with variable results, for the treatment of recurrent mandibular dislocation.^{46,51}

Surgical Techniques That Enhance the Condylar Path

Riedel, in 1883, was the first to report the surgical treatment of TMJ dislocation. His technique involved a unilateral excision of the condyle (condylectomy). It was subsequently described by Myrhaug,¹ who introduced a procedure in which the entire eminence was removed to completely



Figs. 5: Transcranial radiographs of a 45-year-old woman with a four-month history of a mandibular dislocation (Case 4). The left (top) and the right (bottom) TMJ are severely dislocated. (c: condyle, e: eminence, f: fossa).

eliminate any interference to condylar movement. He reported on the successful treatment of two cases in 1951.¹

Other surgical procedures for the treatment of recurrent dislocations have included meniscectomy⁴⁸ and closed condylectomy.^{49,50} Tasanen and Lamberg used the Kostecka method (with a Gigli saw and no MMF) to treat 21 patients.⁵⁰ Seven patients had recurrences for two years, and 14 patients had them over at least one month. At the one-year follow-up, 17 patients no longer had dislocations, two underwent a further procedure, two were unsuccessful, and one case developed a pseu-

doarthrosis requiring a costochondral graft.⁵⁰

In the United States, Irby popularized the same technique described by Myrhaug. He reported obtaining good results in the treatment of 30 cases.⁵¹ Critics of this procedure note that it is unphysiologic, that the intraarticular approach may be damaging to the joint, and that zygomatic arch fractures may occur.^{8,47} However, very favorable results have been reported using the eminectomy technique and its variations, and good clinical outcomes have been achieved for many patients with chronic mandibular dislocation.^{5,29,52-55}

Complete removal of the

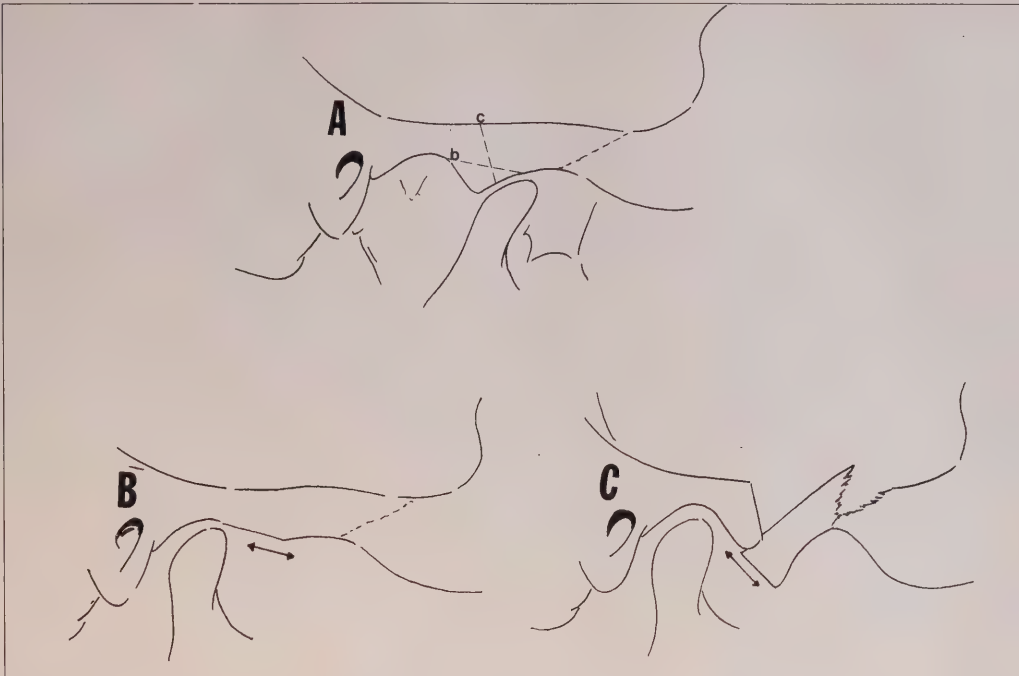


Fig. 6: Illustration of the biomechanical alterations resulting from the eminectomy of the Myrhaug procedure (B) and the augmentation of the Dautrey procedure (C). The normal relationship and outlines of the osteotomies are shown (A).

articular eminence does not lead to intracranial complications. However, since some eminences may have large marrow spaces, resulting in a potential increase in the risk of wound infection, antibiotic therapy is recommended preoperatively and postoperatively.⁵³

Blankestijn and Boering⁴⁷ reported using a modification of the Myrhaug technique with 16 patients. They did not enter the joint proper, but focused on the lateral and anterior joint regions during the resection of the articular eminence. The procedure was completed by suturing the periosteum and cartilage covering the osteotomy site. They operated on 31 joints with eight-month to nine-year follow-ups. Nine patients had no recurrences, five showed some improvement and retained the ability to subluxate, and two had no improvement, but patients subjectively felt an overall improvement. They theorized that the free movement of the condyle and postoperative scar tissue formation were the reasons for success. Although some patients had inadvertent joint pene-

tration, there was no evidence of joint degeneration.⁴⁷

Sensoz et al¹² treated 39 patients with dislocation and 13 with recurrent subluxation. They are the only investigators who compared the eminence height of their study group (10.7 mm) to normal controls (7.4 mm) and found a significant difference. Surgery was carried out using a preauricular approach, and the eminence was removed with chisels. They also measured echographic changes, and found a difference between pre-operative patients and the controls, as well as between the patients preoperatively and post-operatively (i.e. joint noises). The average follow-up was 18 months, but discomfort and slight ache subsided after a few weeks. Symptoms were relieved in almost all patients, but two patients underwent the surgery again to remove more of the medial portions of the remaining eminence. All patients underwent bilateral procedures, as the authors believed that both joints would eventually become symp-

tomatic even in the presence of unilateral dislocation.¹²

Mandibular Dislocation: Etiologic Factors

A variety of factors have been implicated as causative agents in mandibular dislocation. These include trauma, yawning, drugs, anesthetic procedures, psychiatric disorders, muscular dyskinesias, and connective tissue disorders.

Extrapyramidal side effects have been observed with certain antiemetics (metoclopramide).²⁰ In addition, certain drugs used in the treatment of psychiatric conditions have been reported to cause extrapyramidal effects, including phenothiazines (used in the treatment of schizophrenia),⁵⁷ haloperidol,¹⁹ and thiothixene.²¹

Several psychiatric disturbances may produce mandibular dislocations. The recurrent subluxation of the TMJ referred to by Patton as psychogenic subluxation may be the primary presenting feature of psychiatric disturbances.²² The clinical pattern of dislocation in this group of patients may be



chronic recurrent or chronic persistent in nature, and unilateral or bilateral. In addition, redislocation after successful reduction is not uncommon. Dislocations may also result from dyskenesias that may be psychiatric in etiology, or due to abnormalities in the extrapyramidal system.⁵⁸

Anesthetic procedures are commonly associated with dislocations. Subluxation and dislocation have been reported during induction,⁵⁹ during intubation,¹⁴ and during fiberoptic bronchoscopy.¹³ Since the majority of these occurrences are acute in nature, immediate reduction is usually successful.

Although some medical literature indicates that yawning rarely causes mandibular dislocation,^{17,18} this review indicates that it does so quite frequently.^{4,16,25,50}

Patients suffering from connective tissue disorders can develop dislocations of the TMJ. A 17-year-old woman developed painful TMJs, and then one year later began to experience frequent dislocations. She also developed patellar and radio-ulnar dislocations, and was diagnosed with Ehlers-Danlos syndrome. After failed treatment (immobilization, condylotomy), she was managed with a condylectomy and elastic traction.⁵⁶

Summary

Ideally, acute mandibular dislocation requires immediate effective reduction, which can usually be accomplished with a closed technique. Dislocations that persist for more than one month are classified as chronic, and although they may be effectively reduced by conservative means using traction devices, they often demand the use of adjunctive techniques, including manipulation under general anesthesia and/or surgical techniques. While successful results are usually achieved with eminence augmentation, eminectomy is equally effective and produces fewer complications.

Four case reports emphasizing the unpredictability associated with the management of some patients with chronic mandibular

dislocation have been presented, in addition to a review of non-surgical and surgical treatment. ■

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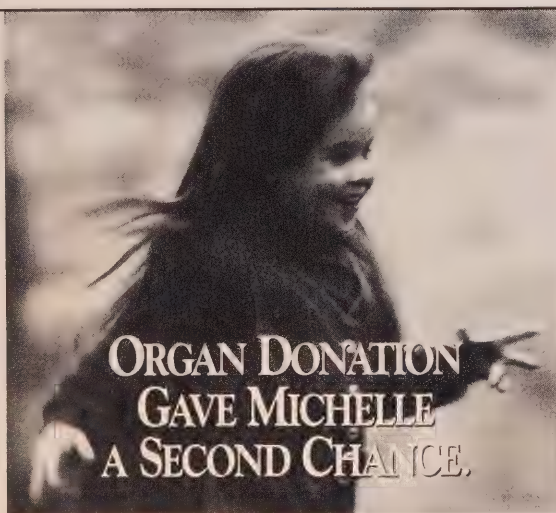
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1998 New Zealand Dental Association Conference in Wellington, New Zealand. Contact Dr. W. Gaudie, Conference Secretariat, P.O. Box 5321, Wellington, NZ. Tel.: +64 4 384 7606; fax: +64 4 384 6594; e-mail: wmgaudie@clear.net.nz

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CANADA



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October 2

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Southern Ontario Surgical Orthodontic Study Group in Windsor, Ont. Contact Dr. Jeff Berger. Tel.: (519) 258-2632; fax: (519) 258-2637; e-mail: jberger@mnsi.net

October 2-3

What's New in Oral Health in Halifax, Nova Scotia. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, NS B3H 3J5. Tel.: (902) 494-1674; fax: (902) 494-2527.

October 17

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November 8-13

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December 4-5

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September 16-19

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February 11-13, 1998

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July-Aug.
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Since last September, the SLSA Program has been published as a monthly feature in the *Journal of the Canadian Dental Association* as a resource for dentists wishing to enhance their knowledge and expertise. It is intended as a vehicle for self-learning and self-assessment. The program is based on a series of 40 questions, answers, rationales and references, followed by a quiz of 15 questions. Included with the June issue of this *Journal* was the Quiz for the 1997-1998 SLSA Program, together with a response card.

All 10 provincial licensing authorities in Canada recognize the SLSA Program for continuing education credits. In order to receive these credits, dentists must complete and return the enclosed response card to the Canadian Dental Association by August 31, 1998. The names of those dentists who return the completed quiz response cards will be forwarded to their respective licensing authorities for consideration.

Answers to the Quiz will be published in the September 1998 issue of the *Journal*. Quiz results will not be provided by either CDA or SLSA.

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Journal

July-Aug.
1998
Vol. 64
No. 7

INFECTION CONTROL



Antimicrobial Resistance: Dentistry's Role

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ABSTRACT

The resistance of bacteria, fungi and viruses to antimicrobials is increasing rapidly, with deleterious consequences. Dentistry's role in this development is unclear, because the necessary information has not yet been collected. Nevertheless, dentists should recognize that it is essential to use antimicrobials in an appropriate and responsible manner, both to treat infection effectively, and to minimize the likelihood that the bacteria in the general population will develop resistance to antimicrobials. The purpose of this article is to make dentists aware of the concerns raised by antimicrobial resistance, and how it can be avoided.

Introduction

Antibiotics are invaluable drugs in the management of infectious disease. Unfortunately, their value is being jeopardized by the presence of microorganisms resistant to their effects.¹⁻¹⁹ This resistance was first observed in the 1940s, when it was discovered that penicillin was no longer always effective against *Staphylococcus aureus*. Since then, a succession of new antibiotics has been required to cope with the ongoing emergence of new strains of resistant bacteria, which have rendered even newly-

formed drugs ineffective. The competition between new drug development and the emergence of new resistant organisms continues today. Currently, the most serious concern is that the bacteria are winning the race.

The emergence of resistant organisms has potentially serious consequences for society. Infection by resistant microorganisms can be fatal to susceptible individuals, such as the immunocompromised, the elderly, and the debilitated. In May 1997, this concern led Health Canada and the Canadian Infectious Disease Society to organize a national conference entitled "Controlling antimicrobial resistance: an integrated action plan for Canadians," which was held in Montreal. The goal of the conference, at which the authors of this article represented the Canadian Dental Association, was to develop a plan to limit the development and transmission of antimicrobial resistance in Canada.

A number of recommendations aimed at reducing the threat of antimicrobial resistance were formulated during the conference. As a result of these recommendations, a Canadian coordinating committee on antimicrobial resistance will be convened, and a surveillance system will be established that, in

part, will help to identify the scope of antimicrobial resistance and antimicrobial usage in long-term care facilities. Another goal espoused by the conference is to achieve a 25 per cent overall reduction in the number of prescriptions for antimicrobials within three years, which could be achieved by focusing on community acquired respiratory infection. In addition, the perceptions of both the public and physicians about the risks and benefits of antimicrobial therapy will need to be improved.

Antimicrobial resistance is an issue that affects all Canadians, including dentists. The purpose of this article is to raise dentists' awareness of antimicrobial resistance by reviewing the current status of the problem, and considering ways in which dentists can minimize our potential contribution to it.

The issue of antimicrobial resistance is no longer a topic of discussion for scientists and health professionals alone. There is an increased public awareness of the importance of antimicrobial resistance, stemming largely from reports in the media, including several published on the front pages of national newspapers.^{20,21}

This exposure has made our patients much more knowledgeable on the subject of anti-

Table 1

A Short Glossary

Term	Meaning
Plasmid	Genetic element that is not a part of the bacterial chromosome, which is not essential for growth and which has no extracellular form. Generally circular, these elements can "jump" from one organism to another, even across species lines. These elements become "vectors" for transferring genes from one bacterium to another. Such genes include genes for antibiotic resistance. ^{22,23}
Transposon	A type of transposable genetic element which in addition to consisting of genes that allow movement in the genome, carries other genes with it. These other genes frequently provide properties such as antibiotic resistance. The availability of such resistance genes then selects in favor of bacterial strains carrying the resistance genes. Transposons carry genes ("jumping genes") around the bacterial chromosome and also carry genes into and out of plasmids. ^{22,23}
Vector	Vector is a term for a genetic vehicle, such as a plasmid or phage, that can carry genes from one bacterium to another. Such genes include genes for antibiotic resistance. ^{22,23}
(Bacterio)phage and Transduction	Phages are viruses that infect bacterial cells. These phages are "vectors" that need to get their own genetic material inside bacteria to multiply. In accomplishing their own replication, phages frequently carry other genetic material (sometimes plasmids) from one bacterium to another in a process called transduction. ^{22,23}
Conjugation	Bacteria engage in "sex" to exchange genetic material. This exchange can take place when bacteria are stressed as is the case when they are being affected by antibiotics. This exchange is not always restricted to members of the same species. Such exchange can include genes for antibiotic resistance. ²²⁻²⁵
Antiporter or Efflux pump	Selective carriers bring externally available metabolites into bacterial cells and export metabolic end products. Antiporters are part of the normal components of cell membranes that carry specific substances out of cell interiors. Selective and highly active antiporters act as efflux pumps that can pump antibiotics out of bacterial cells as fast as they enter. Overexposure to an antibiotic provides an environmental pressure on bacteria that selects for bacterial strains with genes that encode highly active antiporters. ^{26,27}
Multiple resistance	Sometimes plasmids have accumulated genes for resistance against more than one type of antibiotic. Some antibiotics, such as tetracycline, encourage the process of acquisition of antibiotic resistance. In some cases, organisms acquire resistance to more than one antibiotic because the plasmids they acquire carry several different genes for different types of antibiotic resistance. ^{22,26-28}

icrobial resistance, and we should be prepared to answer their questions. To help facilitate these discussions, **Table 1** provides a brief glossary of the current terms.

Antimicrobials include antibacterial, antifungal and antiviral drugs. Although the term antibiotic strictly refers to the chemical substances produced by microorgan-

isms, the common usage is to include synthetic compounds as well. Antibiotic use is very widespread. In 1996 in Canada, physicians wrote over 26 million

prescriptions for antimicrobials, with amoxicillin being the one most commonly prescribed.²⁹ The number of antimicrobial prescriptions written by dentists is not known at present. In the United States, more antibiotics are sold than over-the-counter medications. Currently, one prescription for antibiotics is written for every six physician visits.¹⁴ In a day-care centre of more than 25 children, at least one child will be on an antimicrobial agent each day. Antibiotics are often prescribed for infections that are viral in origin, even though antibiotics are ineffective in these cases. This inappropriate prescribing may be attributed to pressure being put on the physician by the patient or parent to do something active, as opposed to letting an ear infection or respiratory infection resolve on its own. However, inappropriate prescribing leads to the selection of resistant microorganisms, and to an increased transfer of the genes responsible for this resistance from the resistant organisms. The increased use of broader-spectrum antibiotics and the widespread use of antimicrobials for immunocompromised patients have also contributed to the selection of multi-drug resistant organisms that cause nosocomial (hospital acquired) infections.³⁰

Which organisms are involved? Whereas penicillin was once very effective against *Staphylococcus aureus*, today over 95 per cent of all *Staphylococcus aureus* are resistant to penicillin. Other examples of resistant bacteria include penicillin-resistant *Streptococcus pneumoniae*, methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *Staphylococcus aureus* (VISA), vancomycin-resistant *enterococcus* (VRE), *Candida albicans* resistant to fluconazole, *herpes simplex* virus resistant to acyclovir,³¹ multi-drug resistant tuberculosis, and human immunodeficiency virus (HIV) resistance to zidovudine.³² Infection by any of these organisms may require treatment options that are currently

Table II

General Mechanisms Of Resistance to Antimicrobials

Microorganisms may:

- produce an enzyme which destroys the drug
- prevent the attachment of the drug
- prevent penetration of the drug internally
- pump out the drug before it can be effective
- change the metabolic pathway to bypass the antibiotic-sensitive step

Microorganisms acquire resistance by:

- random gene mutation
- receiving genetic material from other resistant organisms

limited or unavailable, and all of these organisms or agents can kill susceptible individuals.

It is worth noting that approximately 50 per cent of all the antibiotics produced today are used in agriculture, including fish farming.¹⁵ In spite of the extensive use of antibiotics in agriculture, their impact on the development of antimicrobial resistance has not been fully investigated. Approximately 60 per cent of the antibiotics used in food animals are administered for disease prevention, 25 per cent to promote growth, and only 12 per cent to treat a specific identifiable disease. Nevertheless, the antibiotics employed in food production could result in human exposure to resistant organisms.

Mechanisms Of Bacterial Resistance

Infectious organisms may develop resistance to antibiotics and antimicrobials by a number of mechanisms, as summarized in **Table II**. Microorganisms can produce enzymes that destroy the administered drug. For example, *Staphylococci* produce the enzyme beta-lactamase, which destroys penicillin and cephalosporins. In some cases, microorganisms can change their permeability and not allow the prescribed drug to invade them. Tetracycline resistance is an example of this mechanism. In other cases, the receptor site for the

drug may be altered, which is the mechanism underlying erythromycin and vancomycin resistance. Metabolic pathways may also be altered, as is found with sulfonamide resistance. Other mechanisms are known as well, and bacteria continue to develop new means of resisting the effects of antibiotics. The mechanisms of resistance to the antibiotics used in dentistry are listed in **Table III**.

Patients may develop a drug-resistant infection either by contracting a resistant microorganism or by having the resistance arise once antibiotic treatment has begun. A spontaneous mutation may occur, or resistance can be transferred from one species to another through DNA strands or plasmids. Even unrelated bacteria may share genetic information, an ability that was unanticipated during the first two decades of antibiotic use. In addition, because some of the antibiotic resistance genes are acquired as a group, the microorganisms that receive one of these genes frequently become resistant to other unrelated antibiotics. Once a microorganism becomes resistant, there is selective pressure favoring its growth as other, nonresistant organisms are eliminated by the antimicrobial drug.

Most antibiotics originate either directly from a microbe, or are chemically-modified versions of products produced by microbes.⁴³ Does every new antibiotic require

Table III

Bacterial Metabolic Changes In Response To Antibiotics

Antibiotic	Target For Antibiotic Activity	Microbial Response
Penicillin (and Cephalosporins)	Cell wall synthesis	a) Beta-lactamase destroys penicillin lactam ring. ^{28,33} b) Enzymes making cell wall become resistant to penicillin effect. ³⁴ c) Proteins that bind penicillin change shape. ³⁴ d) Reduced autolysis. ³⁵
Erythromycin	Ribosome protein synthesis	a) Antiporter efflux pump pumps molecule out as fast as it gets in. ³⁶ b) Alter the shape of microbial molecules that would otherwise bind the antibiotic.
Tetracycline and related antibiotics	Ribosome protein synthesis	a) Antiporter efflux pump pumps molecule out as fast as it gets in. ^{33,37-39} b) Alter the shape of microbial molecules that would otherwise bind the antibiotic. ^{33,37-39}
Sulfa drugs Trimethoprim	Interferes with normal bacterial metabolism. (e.g. Sulfa drugs and trimethoprim interfere with folate metabolism.)	Microbial metabolic processes are changed and enzyme systems change their characteristics. ⁴⁰
Metronidazole	DNA is damaged when the drug is activated by bacterial nitro-reductase enzymes	a) Microbial nitro-reductase is changed and no longer activates metronidazole into damaging form. ^{33,37} b) Reduced uptake. ^{33,37}
Vancomycin	Peptide antibiotic interferes with manufacture of cell wall	Microbial enzyme systems change to make a slightly different cell wall that is not affected by this peptide antibiotic. ^{41,42}

bacteria in order for new mechanisms of resistance to develop? The simple answer is no. Bacteria represent an extremely diversified branch of living organisms, which have been living with each other for millions of years in places such as the sea, hot springs and soil. Bacteria have developed a variety of resources that make them capable of resisting environmental pressures.^{2,5-7,9,10} Their short generation times facilitate their ability to deal with the drugs aimed at harming them. Bacteria have an extremely long history of success-

fully dealing with each other's stratagems, including antibiotics.

Particular antibiotics provide the kind of environmental pressures that promote the development of bacterial resistance not only to themselves, but also to other unrelated antibiotics. Researchers have recently looked at collections of bacterial strains that pre-date the introduction of antibiotics into clinical use, and have found bacteria that were resistant to tetracycline or erythromycin.⁴⁴

Oral bacteria make substances called bacteriocins that interfere with each other.⁴⁵⁻⁴⁷ Mammalian

mucosal cells and white blood cells make a wide array of peptide antibiotics that are now termed defensins. Oral bacteria have evolved in the presence of mucosal defensins^{48,49} and, like all other bacteria, have a long history of responding successfully to antimicrobial challenge.

Implications For Dentistry

Dentistry's impact on the development of antimicrobial resistance is not known at present, but researchers are beginning to look at this question. Our contribution is difficult to determine, as there are currently no accurate data available

Table IV
Principles For Prescribing Antimicrobials

- Use only when there is an indication.
- Use only when the risk/benefit balance is favorable.
- It is not a substitute for establishing adequate drainage.
- Choose the narrowest spectrum drug that will be effective.
- Prescribe an adequate dose.
- Consider a loading dose.
- Prescribe at an appropriate frequency.
- Prescribe for an appropriate duration.
- Choose the drug with the fewest side effects.
- Choose the least expensive agent.

Additional considerations:

- Consider laboratory identification and sensitivity tests to target specific bacteria with antibiotics identified as effective.
- Recognize that antibiotics encourage development of resistance if used for too long and/or at sub-optimal doses.
- Consider alternatives to antibiotics such as topical debridement and application of topical antiseptics.

in Canada on the number of prescriptions for antibiotics being written by dentists. Whatever the statistics on dental prescribing show eventually, it is already recognized that dentists must use antibiotics appropriately.^{1,12,13,18,19}

Antibiotics should be used only for the management of active infectious disease or to prevent the potential systemic spread of infection in a patient known to be at risk.^{12,18} The guidelines for prophylaxis against bacterial endocarditis, as well as the recommendations for more limited antibiotic use in patients with total joint replacement, have recently been updated.^{50,51} It is important to follow these revised recommendations, and to only use prophylactic antibiotics when there is a clear indication to do so. The new recommendations were developed, in part, in response to the recognized problem of microbial resistance to antibiotics.

Orofacial infections must be treated with local drainage whenever possible. Antibiotics should be considered as adjuncts to treatment when there are signs of systemic involvement, such as extra-

oral, neck or intraoral airway swelling, or fever. Antimicrobials are not the primary treatment for dental infections, except in the case of primary spreading cellulitis. Antibiotics should be used very selectively in periodontal treatment, and ideally only in selected patients where a laboratory has identified the presence of specific target organisms.

The routine use of antibiotics before or after extractions or endodontics has not been shown to be effective.^{1,52} Therefore, routine prescribing for every extraction or endodontic procedure must be discouraged. Before prescribing antibiotics, we should weigh the risks of resistance and allergy against any potential benefit. Our decisions on antibiotic use should be supported by the current literature, which is continually being updated as bacteria develop new "tricks" to cope with antibiotics.

Recommendations on the use of antibiotics are evolving.^{1,18,53} General principles for prescribing antimicrobials that are consistent with these recommendations are summarized in **Table IV**. The approach of using long durations

of antibiotic therapy is now being challenged. It has been suggested that antibiotics should instead be used in sufficiently high doses for short durations. Clinical judgment must be applied, but most acute odontogenic or periodontal infections will resolve in three to seven days. Prescribing beyond that duration should only be done selectively. When using antibiotics orally, loading doses should be considered to achieve therapeutic levels more rapidly. There must be a clear indication to prescribe. In addition to the risk of promoting resistance, practitioners prescribing antibiotics must consider the potential for drug allergy, gastrointestinal side effects, and the risk of secondary infections such as *Candida*. In the case of superficial infections, topical antiseptics (e.g. chlorhexidine) or antifungals should be considered instead of systemic antimicrobial agents.

The administration of any drug carries with it risks that must be considered against the potential benefits. Only if we determine that the benefits of a drug outweigh the risks involved for a particular

patient should we proceed with its use. We should reconsider routine or automatic prescribing that does not involve adequate clinical investigation or the pursuit of alternative therapies. The exposure of the general population to antibiotics must be reduced to avoid pressuring bacteria into taking evasive measures that will make otherwise useful antibiotics ineffective. We all have to live with the ability of bacteria to adapt to antibiotics. The inappropriate use of antibiotics may affect not only the patients who receive them, but the entire population, including each of us and every member of our own families. ■

Acknowledgments: The authors represented the Canadian Dental Association at the conference entitled, "Controlling antimicrobial resistance: an integrated action plan for Canadians," which was organized by Health Canada and the Canadian Infectious Disease Society, and held in Montreal in May, 1997.

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Resin-Metal Bonding Systems: A Review Of the Silicoating and Kevloc Systems

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ABSTRACT

The Silicoating and Kevloc systems are resin-metal attachment devices that are designed to improve bond strength and decrease microleakage at the resin-metal interface. Clinically, these systems can be used to place resin pontics and veneers, enhance cementation with resin cements, and bond the resin matrix to metal implant substructures. To provide practitioners contemplating the use of either modality with background information, a concise summary of the potential advantages of resin-metal bonding, the procedures required to establish the chemical bond, and the methods of evaluating laboratory studies are presented. Chemical bonding with these systems is technique sensitive. How the system is used may be as important to the final clinical results as is the choice of system.

Clinical Implications Of Resin-Metal Bonding

In prosthodontics, the attachment of a resin matrix to a metal framework may pose significant difficulties. The major problems are related to the strength of attachment and the space available for restorative materials. A low bond strength between the resin and metal may result in microleakage, discoloration or

breakage, while a restriction in the space available to place metal, resin matrix, and denture teeth may result in compromised tooth placement and a less than ideal bond between materials. Limited space may be available for materials if the interocclusal distances are restricted. It can also be a problem when single tooth replacement or resin bonded retainers are provided. Clinically, limited space and low bond strength may result in unacceptable esthetics, a need for excessive adjustment of the occlusion, or the breakage of any of the materials. To prevent clinical problems, it is therefore imperative to optimize the strength of the resin attachment to the metal framework, and ensure that there is sufficient room for materials.

Until recently, the attachment of the resin matrix to a metal framework has been maintained primarily through mechanical retention. Mechanical retention can be achieved using latticework, mesh, beads, and various posts.¹ Alternative attachment mechanisms are now available, however, including micromechanical and chemical attachment systems.

Micromechanical attachment can be accomplished using sand-blasting, electrochemical etching, and chemical etching.² Conversely, chemical attachment may be achieved using adhesive

cements, porous metal coatings, tribochemical coating, Silicoating³ and the Kevloc system. These alternative attachment systems are used either as an addition to or in place of conventional macromechanical retention.

The "ideal" attachment system should produce and maintain a strong and consistent bond between the resin and metal. Our interest in new resin-metal attachment systems stems from the problems that have been experienced with macromechanical retention as well as the current resin-metal attachment mechanisms, both of which exhibit failure at the resin-metal interface.

Advantages

What are potential advantages of the alternative resin-metal attachment systems?

Their manufacturers recommend that we adopt the technique of chemically bonding resin to metal, and eliminate macromechanical retention altogether, for the following reasons:

1. The increase in bond strength between the resin and metal.
2. The decrease in microleakage at the resin-metal interface.
3. The reduction in metal impingement on the space needed to place the resin and teeth.

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4. The improvement in esthetics because of opaquing and increased space.

Uses

Clinically, we have been able to apply chemical bonding techniques to several procedures, including:

1. Resin pontics for cast partial dentures.
2. Resin veneering for conventional and implant fixed partial dentures.
3. Preparation of restorations (onlays, inlays, metal retainers) prior to cementation.
4. Bonding of resin matrix to the metal implant substructure.

Resin Pontics

The attachment of a single prosthetic tooth during the fabrication of a removable partial denture may pose a problem when space is restricted, or it is necessary to achieve a harmonious esthetic result with the adjacent natural dentition.

By fabricating a metal pontic in the cast framework, and then bonding a custom resin facing, it is possible to fabricate a single tooth replacement that has excellent strength and natural esthetics, and will fit into a restricted space. Many of the resin systems available today provide a wide range of shades that can be customized to blend with the natural dentition (**Fig. 1**). However, the resin pontic procedure is technique sensitive and more costly than the conventional procedure of attaching a denture tooth to the cast framework with acrylic resin.

Resin Veneering

Resin can be used for both facings and occlusal surfaces as an alternative tooth colored material to porcelain (**Fig. 2**). The resins are less abrasive and more resilient than porcelain, and they are somewhat easier to apply, adjust and repair. If the clinician perceives these features to be important, resin veneering may provide a substitute for porcelain.

The resin-metal fixed prosthesis also makes an excellent long-term transitional restoration when esthetics and cost are critical.

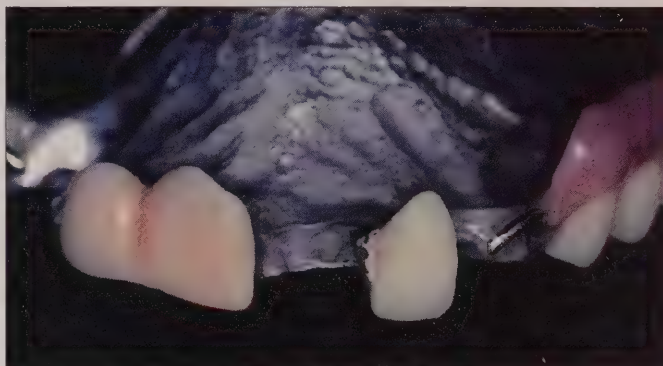


Fig. 1: Resin pontics for single tooth replacement.



Fig. 2: Resin veneers for fixed restorations.

However, the long-term clinical success data to support routine adoption of resin veneering are unavailable.

Restoration Preparation Prior To Cementation

The cementation of inlays, onlays and metal retainers with resin cements can be improved by using micromechanical or chemical systems. For example, applying the opaquing agent on the metal surface of the retainers used for Maryland bridges will mask the metallic color and may significantly improve esthetics. Not all resin-metal bonding systems are applicable to all types of metals or resins, however. Another disadvantage is that the interface layer, crucial for the bond strength, can not be altered at the try-in stage.

Bonding Of Resin To Metal Implant Substructures

When a fixed-removable implant prosthesis is fabricated,

there is often a limited amount of space available for the denture resin and teeth due to the need for a bulky, strong, metal substructure. To prevent resin fracturing or the loss of the resin-tooth complex, it is important to attach the resin to the metal using a combination of mechanical and chemical retention. When space is limited, it is often impractical to incorporate sufficient macromechanical retention. The use of chemical retention systems is an asset in these circumstances. The Silicoater MD system (Kulzer) has been used routinely to provide chemical resin bonding for all our implant frameworks, with generally good results.

What's the Clinical Relevance?

Having an understanding of bonding systems that are primarily used by laboratories may seem irrelevant to a busy practitioner.

However, the systems do have clinical applications that may be advantageous. Being familiar with the process and testing procedures will improve your communication with the laboratory, and help you to choose the best available system. As is the case with the resin bonding systems we use in our practices, it may not be the particular system that is of primary importance, but how it is employed. A high incidence of clinical failure may be indicative of poor laboratory technique, rather than a fundamental flaw in the bonding system. Clinicians should keep the laboratory informed regarding the performance of in-service prostheses.

An intermediary layer can be applied between the resin and metal to improve the attachment or bond of the materials. This laboratory procedure has important clinical implications, although the routine prescription of a bonding system is probably unwarranted at this time. Using the systems involves additional time and expense, which has to be weighed against the potential benefits. However, because there are situations where resin-metal bonding has been shown to be advantageous, it is appropriate to consider its use on an "as needed" basis.

Our experience has been primarily with the Silicoater and Kevloc systems (Kulzer). This article outlines the procedures used to establish the resin-metal bond, and how clinicians can evaluate the laboratory performance of the Silicoater and Kevloc systems. A subsequent article will report on a laboratory study, which examined various factors affecting the bond strength obtained using these systems. Our interest in the performance of these bonding systems arises from observing the clinical failures that occurred in an implant study group over a five year period.¹⁵

Chemical Bonding With the Silicoater MD and Kevloc Systems

Silicoating

In 1984, Musil and Tiller reported achieving improved resin-metal bond strengths through Silicoating, which involved a com-

bination of mechanical and chemical retention.¹³ The original system involved the application of a silica layer to a metal framework pyrolytically, with a subsequent application of a silane coupling agent, followed by the resin. Based on the manufacturer's claims, it was anticipated that the system would provide a superior method of attaching resin to metal for fixed and removable appliances. *In vitro* studies indicated that:

1. Silicoating produced higher bond strengths than adhesive cements.^{5,6,9,11}
2. Silicoating was less affected by thermocycling than other bonding systems.^{10,11}
3. The bond strength was relatively constant and independent of the resin-metal combination.^{5-8,12}

The clinical results needed to substantiate the manufacturer's claims and support the *in vitro* studies were lacking in the North American literature, but were reported by Musil and Tiller in the European literature. However, our own clinical experience indicated that we were achieving varied and inconsistent bonding, which was reflected by the fracture of the resin at the resin-metal interface. The Silicoating technique was awkward in terms of the pyrolytic application of the silica layer, the positioning of the prosthesis within the apparatus, and the fact that the process did not produce a discernable bond layer.

Silicoater MD

The manufacturer subsequently altered the system, by introducing a major change in the method used to apply the silica layer to the metal. Essentially, the technique and machinery used to apply the silica layer were simplified. Another key advantage was that a visible bond layer was discernable with this system. The steps required to use the Silicoating and Kevloc systems are listed in Table I.

Surface Pretreatment

Pretreating the surface of the metal prior to using a chemical bonding system, or as an integral step in the bonding process, is controversial.^{2,6,7,14} Blasting the

metal surface with different materials of various grain sizes has produced conflicting results. In general, it appears that pretreating the metal surface to achieve micromechanical retention will increase bond strength values. Blasting the metal surface with aluminum oxide or sand is thought to increase the surface energy at the metal face, and enhance wettability, thereby improving the adhesion of materials to the metal.²

Establishing the Silica Layer

After the metal surface is pretreated to achieve micromechanical retention, it is cleaned with a chemical (Siliclean) before the silica layer is established in the Silicoater MD unit through a process of vitrification. This process binds silica molecules to free bond sites on the metal surface to form a silica-metal layer of very small molecular thickness. The resulting bond is strong and somewhat elastic, which helps to distribute the strains caused by temperature variations and shearing forces over the metal surface, and reduces microleakage.

Binding the Resin

To bind resins to the silica-metal layer, a silane coupling agent is applied to form a bridge layer, followed by the application of an unfilled resin or opaquer resin to protect the chemically unstable intermediary layer. The application of these different materials, which form the intermediary bonding layers, is done in the laboratory. However, the final application of the resin veneer or resin-tooth matrix is done after the clinical confirmation of the tooth set-up for a removable prosthesis, or the trying in of the fixed framework. The intermediary bonding layers must not be altered during this step, and the surface must be cleaned prior to application of the final resin layer. Failing to remove the wax residue prior to processing will completely negate the advantages of using this chemical bonding system.

The Kevloc System

The Kevloc system (Kulzer) is a more recent method of producing a chemical resin-metal bond. As

Table I
A Comparison Of the Silocoating and Kevloc Procedures

Silocoating	Kevloc
Sandblasting of framework Pressure .4 bar Corundum 250 μ m	Pressure > 2 bar Corundum 110 μ m
Cleaning with Siliclean	Cleaning with dry brush
Airdry	Apply Kevloc primer
Apply Sililink	Airdry
Position in machine, activate cycle	Apply Kevloc bonding agent
Cool down	Airdry
Apply Siliseal	Activate bond with heat handpiece
Airdry	Apply opaquer
Apply opaquer	Apply resin
Apply resin	
Reinstatement of bond requires resin removal over total surface of prosthesis	Reinstatement of bond on discrete areas is possible

with the Silocoating techniques, pretreatment with microabrasion is used to activate and clean the metal surfaces, and improve micromechanical retention. However, rather than chemically cleaning the blasted surface, a cleaning brush is used to remove loose surface particles. The silica layer is then produced by applying a chemical primer and bonding agent, which is thermally activated with a hot air handpiece. This bond layer is protected with an unfilled resin or opaquer resin layer, similar to the Silicoater systems.

The main difference and potential advantages of the Kevloc system over the Silicoater MD system are primarily its reduced complexity, and the smaller number of steps required to establish the bond layer. In addition:

1. Micromechanical pretreatment is accomplished using small size aluminum oxide particles rather than large particle sand. This type of abrasion unit is readily available in the majority of commercial laboratories.
2. Chemicals are an additional expense, and their shelf lives may pose a problem. The chemicals used with the Kevloc system have a six-month shelf life, as compared to a six-week shelf life for the chemicals used with the Silicoater MD system. With the Kevloc system, no chemicals are required to clean the metal surface. This reduces the number of chemicals used.
3. Heat activation is achieved with hot air, not through flaming or the use of a burning chamber. The apparatus is less technique sensitive, and can be used to reinstate the bond layer on a discrete area for repair purposes. With the Silicoater systems, the resin matrix and denture teeth must all be removed before the bond can be reinstated for a repair of a fractured prosthesis.

The Kevloc system's manufacturer advocates its use for the application of resin facings made with Artglass (Kulzer). Clinically, the system has been used in various situations with favorable

results. The manufacturer has reported additional advantages over other systems, including an improvement in bond strength. Although the literature support for this claim is scant, our comparison of the bond strengths achieved with the Silicoater and Kevloc systems *in vitro*, which will be reported on in a subsequent article, does support this claim.

Evaluating Resin-Metal Bonding Systems

There is a conspicuous lack of clinical data to support the application of these bonding systems in practice. Clinical studies are time consuming and costly, and it is customary to see laboratory results used as a proxy for actual clinical testing. However, when the results of laboratory studies are considered, it is imperative to remember that performance under controlled test conditions may not be a valid predictor of clinical performance. Certain considerations may be helpful when interpreting study results.

1. What is the method of testing?

A shear test is the more common testing method, and tends to produce failure at the interface

rather than in the resin. This manner of failure has often been cited as an indicator of poor performance. Failure at the interface may be deemed to be a fault of the bonding mechanism, because a cohesive failure in the resin would seem to indicate that the bond is not as strong as the resin. However, the shear and tension tests that have been reported in the literature tend to produce strength values that are not significantly different. The manner of failure may be primarily a reflection of the test procedure, and not indicative of bond strength or clinical performance. Standardized testing procedures for testing bond strengths are outlined by the International Standards Organization (ISO),⁴ which, if followed, would help reduce the variation in bond strength measurements reported in the literature.

2. Does the test process simulate clinical conditions?

The complexity of the stresses that occur at the resin-metal interface is decidedly different in the oral cavity than in laboratory test procedures. In the oral cavity, a material is rarely subjected to an increased load to the point of failure. Restorations are primarily subjected to repetitive loads below the failure threshold, and fail due to fatigue. The handling and environment the specimens are tested in may also affect test results. For instance, specimens that are thermocycled may more closely approximate those in an oral environment than samples that are kept on the bench top.

3. Was the test process (method) controlled?

In a laboratory study, consistency in materials and methods is required to maintain a standardized test process. A consistency in operator and technique is difficult to achieve even in a controlled laboratory setting, however. Even when the same procedure is used, variation between cases may exist due to variation between operators.¹⁶ Variable results, even under controlled conditions, help to explain why clinical performance is often very difficult to judge. The results have to be fairly dramatic

to produce a discernible clinical effect, especially if the number of cases is modest.

4. What is the effect of the materials?

Bonding results from the combination of the chemical and microretentive aspects of the system being considered. These factors are further influenced by the alloy and resin systems employed. Results can vary not only because of the test methods, but also because of the test materials. The test materials should be identified, and the combinations of resins and metals kept constant, if a comparison between systems is to be made in a specific study.

Summary

Although caution is advised in extrapolating laboratory results into clinical performance recommendations, resin-metal bonding systems have the potential to improve the clinical performance of dental prostheses by improving bond strengths. Generally, laboratory studies indicate that the adhesion of resin to metal is improved by using a bonding systems. Our task is to determine whether the laboratory results indicate that one system provides an appreciably better bond strength value over another system.

All systems rely heavily on appropriate laboratory procedures to provide consistent results. An understanding of the bonding mechanism and laboratory procedures will aid clinicians in their evaluation of study results, communication with their laboratory, and choice of system. ■

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Antimicrobial Treatment Options In the Management Of Odontogenic Infections

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ABSTRACT

Most acute orofacial infections are of odontogenic origin. In normal hosts, however, they usually do not occur without some type of predisposing condition. Early recognition and management of acute orofacial infections is critical, because rapid systemic involvement can occur, especially in children. Antimicrobial therapy has an essential role in the management of these infections. If it is initiated before surgery, it can shorten the period of infection and minimize associated risks. The etiology of odontogenic infections is usually attributed to the endogenous flora of the mouth, and not to the introduction of non-resident bacteria. Odontogenic infections are typically polymicrobial; however, anaerobes generally outnumber aerobes by at least four fold. The penicillins have historically been used as the first-line therapy in these cases, but increasing rates of resistance have lowered their usefulness. Bacterial resistance to this class of agents is predominately achieved through the production of β -lactamases. Clindamycin, because of its broad spectrum of activity and resistance to β -lactamase degradation, is an attractive first-line therapy in the treatment of odontogenic infections.

Introduction

Most acute orofacial infections are of odontogenic origin.¹ The majority of odontogenic infections are self limiting, and may drain spontaneously. However, these infections may drain into the anatomical spaces adjacent to the oral cavity and spread along the contiguous fascial planes, leading to more severe infection.¹ Due to the proximity of the central nervous system and critical respiratory passages, timely efforts are required to establish a patent airway, mechanical debridement and drainage, and appropriate antimicrobial therapy.² This article will focus on the etiology of odontogenic infections, and the antimicrobial therapy used to treat them.

Methods

The content of this review was discussed during a meeting of specialists in pediatric dentistry, oral and maxillofacial surgery, infectious diseases, and microbiology (Toronto, 1997). Current information concerning the etiology, antimicrobial treatment, and antimicrobial resistance of odontogenic infections from 1990 to the present was obtained using a MEDLINE search. Key search phrases included odontogenic and infection, etiology, treatment, antibiotics, and resistance. Expert

opinion and observations concerning the changing behavior of odontogenic infections were included where published data was lacking.

Odontogenic Infections

Odontogenic infections are among the most common infections of the oral cavity. They can be caused by dental caries, deep restorations that approximate the pulp chamber, pulpitis, periapical abscess, periodontitis, periodontal abscess, and pericoronitis. Odontogenic infections may develop into osteoperiostitis of the jaw, osteomyelitis, and deep fascial space infections. In normal hosts, acute odontogenic infections usually do not occur without some type of predisposing condition, such as periodontal accumulations, necrotic pulp tissue, or tissue damage associated with trauma or surgery.

The increasing rates of antimicrobial resistance are well recognized and described in the literature. However, there is some evidence to suggest that virulence has also changed in some bacteria.³ The epidemic of Brazilian purpuric fever in 1990, which was associated with a new clonal variation of *Haemophilus influenzae*, and the more recent devastating invasive infections caused by

A number of clinical trials have demonstrated clindamycin's efficacy in treating odontogenic infections.^{25,36-39} Gilmore et al demonstrated comparable activity between clindamycin and penicillin V in the treatment of moderate to severe odontogenic infections.³⁶ Von Konow reported similar findings, but the clindamycin group had a shorter duration of fever, pain, and swelling.³⁷

Clindamycin has been used successfully to treat patients when therapy with other agents has failed.^{25,39} Thirty patients with a history of unsuccessful treatment involving scaling, periodontal surgery, and tetracycline therapy were treated successfully with scaling and clindamycin.³⁹ Heimdahl et al and Witcher et al reported on a series of patients failing penicillin therapy due to β -lactamase producing *P. melanogenicus* (*Bacteroides*).^{24,26} All were successfully treated with clindamycin.

Clindamycin's broad spectrum of coverage and excellent clinical efficacy, coupled with the increase in both penicillin resistance and the reports of treatment failures with penicillin, has prompted the *Sanford Guide to Antimicrobial Therapy* to replace penicillin V with clindamycin as the drug of choice in treating odontogenic infections.²⁸

Several studies have demonstrated clindamycin's efficacy in preventing dry socket.^{40,41} Kupfer reported that clindamycin significantly reduced the incidence of dry socket following the removal of impacted mandibular third molars compared to three controls, lincomycin, penicillin V, and furacin powder.⁴⁰ Trieger and Schlage also demonstrated that clindamycin, embedded in gelfoam, was significantly more effective in preventing dry socket than placebo-treated sockets.⁴¹

Recently, the American Heart Association recommended giving clindamycin, rather than erythromycin, to penicillin-allergic patients requiring endocarditis prophylaxis.²⁰

Fluoroquinolones

The fluoroquinolones currently available in Canada are ciprofloxacin, norfloxacin, ofloxacin, and levofloxacin. These agents are bactericidal, and exert their antibacterial effect by inhibiting DNA gyrase and topoisomerase IV.⁴² The fluoroquinolones have potent gram negative activity, including activity against *Pseudomonas* spp. Their activity against gram positive bacteria is marginal, however.⁴² Due to the spectrum of organisms associated with odontogenic infections, the use of fluoroquinolones in the treatment of acute odontogenic infections should not be considered.

Oral Versus Intravenous Antibiotics

Most infections, when treated in a timely matter, can be adequately managed using oral therapy. Patients with no airway swelling, eyelid swelling or neck involvement, who have normal oral intake and systemically feel well, are good candidates for oral therapy. However, intravenous antibiotics and hospital admission should be strongly considered when swelling of the airway, swelling of the eyelid, or neck involvement is present, or the patient's level of activity and oral intake is decreased. The presence of airway or eyelid swelling and neck involvement also warrants a diagnostic CT scan to avoid potentially disastrous complications.

Summary

Odontogenic infections are typically polymicrobial. The pathogenesis of odontogenic infections is dependent on a synergistic relationship between aerobic and anaerobic bacteria.

The last decade has seen a notable change in the behavior of odontogenic infections. The severity of these infections is far greater than in the past, demanding swift recognition of the disease followed by prompt, more aggressive treatment. Failing to identify and treat these infections promptly may result in disastrous outcomes,

as occurred in a recently sensationalized case entitled "Death of a Toothache Victim," which was reported in March 1998 in the *Toronto Star*.⁴³

Historically, the penicillins have been used as first-line agents in the treatment of odontogenic infections. The increasing prevalence of β -lactamase production in dental pathogens and the coincident reports of clinical failures have decreased the usefulness of these agents, making clindamycin more attractive. Amoxicillin, however, is still the drug of choice for prophylaxis against endocarditis.

Clindamycin has been increasingly tested for use in a variety of dental infections. Even in situations where penicillin has failed, clindamycin's excellent activity against both aerobic gram positive cocci and anaerobic pathogens make this agent well suited in the treatment of odontogenic infections. ■

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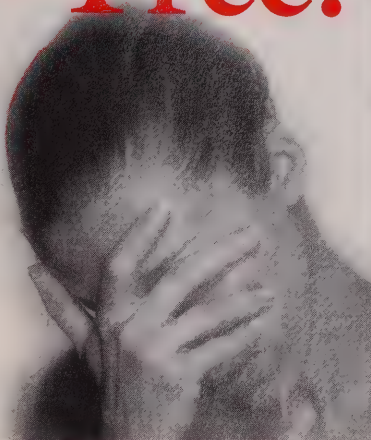
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Mr. Eric Sorensen, President and Mr. Al Robertson, Vice-President of Warner-Lambert Canada Inc., and Dr. Toby Gushue, President of the Canadian Dental Association, are pleased to announce Warner-Lambert's sponsorship of the CDA President's Dinner, held in conjunction with the 1998 Annual Meeting of the CDA Board of Governors in Ottawa.

Warner-Lambert, maker of Trident Gum and Original, Cool Mint and Fresh Burst Listerine Antiseptic Mouthwashes, extends its best wishes to the Canadian Dental Association, its President, Dr. Toby Gushue, and incoming President, Dr. Richard Sandilands.



Trident



FRESH BURST LISTERINE

Journal

July-Aug.
1998
Vol. 64
No. 7

Coping With Divorce

Elizabeth MacNeill, DDS, CA

Divorce raises many emotional and financial issues within a family. Recent changes to the federal tax system may have a significant financial impact on child support payments, and the amount of funds available to parents for child support. If you are currently making or receiving child support payments, these changes may also affect the child support agreement you have with your former spouse.

Child Support Payments

Child support payments are paid directly to a third party for the benefit of the child, and cannot be identified in an agreement as being intended solely for the support of the (former) spouse and/or the parent of the child.

Several key changes in the regulations concerning child support payments went into effect May 1, 1997. These changes were included in the 1996 federal budget in response to concerns that the existing rules were unfair and tended to penalize the custodial parent receiving child support payments.

Prior to May 1, 1997, child support payments were normally included in the custodial parent's income and taxed accordingly. At the same time, the contributing parent was allowed to deduct the payments from his or her taxable income.

With the changes, the child support you have paid, pursuant to a court order or under a written agreement dated on or after May 1, 1997, is no longer tax deductible. Conversely, your spouse will not have to include these funds in his or her taxable income.

However, if child support payments are being made subject to a written agreement or court order that was in place before May 1, 1997, the old tax rules will remain in place until one of the following situations occurs:

- 1) The agreement or court order is amended to increase or decrease payments;
- 2) The agreement or court order is revised to include a clause stating that the new tax rules will apply; or
- 3) Both parents file a joint irrevocable election form (form T1157) with Revenue Canada to have the new tax rules apply to them. This election allows the payer and recipient of child support to switch to the new rules without having to change their existing court order or written agreement in any way.

Spousal Support Payments

Spousal support payments are not subject to the new rules, even if the agreement or court order stipulating the amount of these

payments is changed on or after May 1, 1997.

Spousal support is an amount that is specified in an agreement or court order as being solely for the support of the (former) spouse and/or the custodial parent of the child. Because it is not subject to the new rules for child support payments on its own, the spousal support paid by you under a written agreement or court order is tax deductible. In turn, your former spouse will be required to include this amount in his or her taxable income.

However, when both spousal and child support payments are to be made under the new tax rules, all payments will initially be viewed as child support payments. All child support must be paid before you, as the payer, can claim a deduction for spousal support, or your spouse has to report spousal support received. If these payments are made or received under an agreement that does not clearly indicate a separate amount for spousal support, the full amount will be treated as child support. Similar rules are followed for payments made to a third party (a landlord, for example) that are not clearly designated as spousal support payments.

Example

Dr. Sue and Joe have had a written agreement in place since February 1995. Joe has the custody of their two children.

According to the terms of the agreement, Dr. Sue must pay \$1,000 per month in child support and \$500 per month in spousal support to Joe.

Dr. Sue and Joe do not want to change their agreement, but want the new rules to apply on August 1, 1998. They therefore sign and remit Form T1157, Election for Child Support Payments, to Revenue Canada. The child support payments (\$1,000/month) Dr. Sue made on or after August 1, 1998, will no longer be included in Joe's income nor deducted from Dr. Sue's income. However, the spousal support payments (\$500/month) made on or after August 1, 1998, will still be included in Joe's income and deducted from Dr. Sue's income. If the required child support payments had not been made by Dr. Sue on or after August 1, 1998, then no spousal amount would be considered paid.

Modifying Agreements Or Court Orders

Either party to a child support agreement or court order can unilaterally seek a variation of the agreement or court order that would bring the new tax rules into play. When parents with an agreement or court order already in place

are trying to decide whether to adopt the new tax rules, it is important to weigh different factors.

Non-monetary issues, such as the emotional costs of initiating the process, as well as possible changes in visitation rights, custody, and spousal support levels, may deter the parties to such an agreement from seeking changes.

Monetary factors, such as calculating the amount of after-tax child support available under the new and old tax rules, can also be a deterrent.

This calculation may be affected by another change that went into effect on May 1, 1997, when new Federal Child Support Guidelines were implemented. These guidelines require child support payment amounts to be based on the contributing parent's annual gross income. Other related guidelines, which can be adjusted in certain cases, and vary from province to province, are available from the Department of Justice or on the internet at <http://canada.justice.gc.ca>. Basically, the amount of the child support payments increases with the number of children and the income of the payer. No consideration is given to the recipient's income. Provincial or territorial guidelines will overrule the federal guide-

lines in cases of separation, if the parents were never married, or if a province has enacted its own guidelines.

Before deciding how to proceed, bear in mind that there would be a net tax savings to the family under the old tax rules, provided the payer's marginal tax rate is significantly higher than the recipient's. On the other hand, if the recipient is in a higher tax bracket, an election to have the new tax rules apply will save the family tax. If both parents are in the same tax bracket, then it is likely that they would elect into the new tax rules, thus eliminating the need for instalment payment adjustments or withholdings at source.

There have also been some tax changes for non-residents receiving child support payments from Canadian residents. Most notably, there will no longer be withholding taxes on these payments. Prior to this change, the withholding taxes on child support payments to non-residents were usually 25 per cent, but varied depending on the treaties in place. This change has been in effect since April 1997, and applies to both child and spousal support payments.

These changes address a social concern, but also come with a definite cost. Recipients of child support payments subject to the new tax laws may be disappointed to learn that since this payment no longer qualifies as earned income, it cannot be included in the calculation of their RRSP contribution limit. This disadvantage is an important consideration to be remembered when child and spousal support financial arrangements are being negotiated.

Due to the complications of the new tax rules, it is important for couples considering changes in their agreements or trying to reach a new agreement to consult with a professional tax planner. ■

Dr. Elizabeth MacNeill is a chartered accountant, working with Deloitte & Touche, Mississauga, Ont., in the tax group.

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Journal

July-Aug.
1998
Vol. 64
No. 7



Thank you Terry!

Mr. Terence Davis, CDA's Manager of Publications for the past seven years, has moved on to a new position with the Canadian Council of Professional Engineers. During his time with CDA, Terence played many roles with great dedication: writer, reporter, editor, photographer and administrator among them.

Terence's talents and hard work will be missed by his former colleagues at CDA. We wish him luck in his new career.

John P. O'Keefe, Editor

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BOARD OF GOVERNORS

NOTICE OF MEETING Annual Meeting

The Annual Meeting of the Board of Governors of the Canadian Dental Association will be held September 18 and 19, 1998 (Friday and Saturday), at the Westin Hotel, Ottawa, commencing at 9:00 a.m.

It is brought to your attention that the meetings of the Board of Governors are open to all members of the Association.

Simultaneous translation will be made available provided that a member requests and confirms that he/she will utilize this service. Notice must be provided to Suzanne Burton, Coordinator, Governance, at least ten (10) days in advance of the meeting date.

The Board is composed of twenty-six governors with voting privileges and a chairman. Governors represent members across Canada on a 1 to 500 ratio. The Canadian Forces Dental Services and Student members are represented by one member each.

In addition, there are two non-voting members, namely the senior dental representative of Health Canada and Veterans Affairs Canada.

A complete listing of the Board of Governors follows:

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The ODA/CDA 1998 National Convention was held May 7th - 9th at the Metro Toronto Convention Centre in downtown Toronto.



The registration area was very busy but pre-registered delegates found it quick and easy to pick up their kits and badges.

Going up to the Trade Show.



Here are some of the highlights



So much to see and barely enough time to go through all the exhibits.



"Food as Medicine", a culinary demonstration given by Fran Berkoff (left) and Bonnie Stern (right) was a nutritional and tasty sensation.



Capacity crowds on both days kept the exhibitors really busy.

Our Keynote speaker, Ms Shirley Roberts highlighted the Opening Breakfast at Planet Hollywood. Below (l-r), she is accompanied by Dr. Toby Gushue, President of the Canadian Dental Association; Dr. Jack Cottrell, President of the Ontario Dental Association and



Mr. Michael Hart, Chairman of the Board, Ash Temple Limited, proud sponsors of the Keynote Address.



Periodontal Instrumentation hands-on workshop – Dr. James Grisdale (l) offering one-on-one information to Dr. Phil Poplak.



Hands-on workshop on Esthetics with Dr. Paul Belvedere demonstrating composite dentistry.



Cathy Jameson on Practice Management talks about the value of communication to a standing room, hum... sitting on the floor... standing at the door audience. Can you make her out in the crowd? All lectures were well attended.

Ash Temple Limited

— Mercedes Draw:

Dr. Toby Gushue, President, CDA (right) and Mr. Michael Hart, Chairman of the Board, Ash Temple Limited admire the features of the sporty model exhibited at the Show. The draw winner is Dr. Martin Belman.



1998 Canadian Airlines Draw: The winner of the trip for two to any destination within Continental North America is Dr. Barrie Sandham.



Aurum Ceramic/Classic

Draw: The winner of the trip to Costa Rica is Dr. Lisa McLean. Here she is accompanied by Dr. Toby Gushue, President, CDA, Mr. Dave Costanza of Aurum Ceramic/Classic Dental Laboratories and Mr. Doug Patrick, Vice-President of Aurum Ceramic.

Early Bird Cash Prizes Draw



Getting ready to pick the winners, the draw was presided by Dr. Toby Gushue, President, CDA (right) and Mr. Joel Neal, Director of Administration, CDA.



Dr. Toby Gushue presents \$500 cash prize to Dr. Deane I. Murdy (above left), and \$250 cash prize to Dr. Chris Bryant (above right). Other prize winners were Dr. Harold Boudreau (\$250), Ms. Carole Eisenstat (\$500) and Dr. Axente Mucsa (\$1,000).

Highlights of the ODA/CDA 1998 Convention



ODA/CDA 1998
National Convention
Chairs & Presidents:
(l-r) Dr. Jack Cottrell,
President, ODA;
Dr. Rick Bossin,
Co-Chair; Dr. Phil
Greeves, Co-Chair
and Dr. Toby
Gushue, President,
CDA.

Presidents &
Executive
Directors: (l-r)
Mr. Jardine Neilson,
Executive Director,
CDA; Dr. Toby
Gushue, President,
CDA; Dr. Jack
Cottrell, President,
ODA & Mr. John
Gillies, Executive
Director, ODA.



Halifax 1999



Mr. Don Pamenter, Executive Director of the Nova Scotia Dental Association, and Dr. Toby Gushue, President of the Canadian Dental Association show off the beautiful Vulcan Series Kawasaki motorcycle to be drawn as an Early Bird Prize in Halifax next year.

Hope to see you there from August 5th to 7th, 1999!

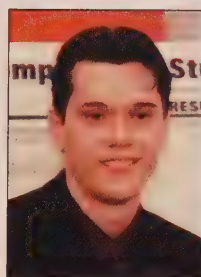
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BRITISH COLUMBIA - Midway: Practice for sale. Dentist enjoys working 3 days a week and living in beautiful Kelowna, B.C. It is the only practice serving many surrounding towns including U.S. communities. Sale includes realty. Please call Paul Goncalves, Wednesday and Thursday evenings, (250) 449-2311 or Friday through Tuesday evening, (250) 769-1955. D271

BRITISH COLUMBIA - Lower Mainland: Exceptional opportunity to become the owner of an established practice in a growing community of the beautiful Fraser Valley. Vendor willing to stay as needed to ensure a smooth transition. Please reply to: Manfred Purtzki, tel. (250) 754-1951, fax (250) 754-1577. B.C. only, toll free, tel. (888) 668-0629 or toll free fax (800) 665-7211. D244

BRITISH COLUMBIA - Victoria Area: Practice opportunity wanted. Mature dentist desires purchase or partnership in Victoria, B.C., or surrounding communities. All offers will be given serious consideration. Please reply in confidence to: CDA Classified Box # 2720. D045

MANITOBA - Winnipeg: GP practice, suburban middle to upper income, 4 days, four operatories plus five additional plumbed, Pan, 1,500 active, 55% overhead (wages 25%), 15 days A/R, 30 new patients/month, recently renovated. Excellent recall system. Highly visible on main artery with lots of parking available. Excellent, happy staff will stay on. Owner leaving province. Call (204) 793-3431. D253

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LABRADOR - NEWFOUNDLAND: Well-established practice for sale. Three new operatories (one hygiene). Excellent staff, full-time hygienist. Computerized, panoramic X-ray. Two specialists rotate through clinic - periodontist, oral surgeon. Call Dave Harris at (902) 421-1533. D293

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D298

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c/o Irwin Johnston
Town of Rainy River
Rainy River, ON P0W 1L0
Fax (807) 852-3553
E-mail rainyrf@fort-frances.lakeheadu.ca

D318

c/o John Weigel, PO Box 3355, Spruce Grove, Edmonton, AB T7X 3A6; tel. (403) 962-4209. D319

ALBERTA - Grande Prairie: Excellent associate opportunity available immediately. A modern, expanding family clinic in a rapidly growing city. Averaging 100+ new patients per month. Please call (403) 539-1151 or fax (403) 532-5116. D203

BRITISH COLUMBIA - Kelowna: Opportunity for associate with a view to purchase. Established, productive practice, great location, new equipment, computerized (Byte). Fun staff and pleasant environment. Tel. (250) 764-8509 (res.); PO Box 29104, Okanagan Mission, Kelowna, BC V1W 4A7 D304

BRITISH COLUMBIA - Duncan: Busy general practitioner requires associate with 2 - 3 years experience to help provide full range of dental services. Must be personable, caring and motivated and enjoy quality dentistry. Practice located 45 minutes north of Victoria in the beautiful Cowichan Valley. Please send resume to: Dr. Philip Collinson, 202 - 149 Ingram St., Duncan, BC V9L 1N8. D284

BRITISH COLUMBIA - Vancouver: City centre. Endodontist required to join prosthodontist and periodontist. Please fax your resume to (604) 877-0499. D280

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Victoria, BC V8T 2C5
Tel. (250) 592-8282
Fax (250) 592-7866

D299

MANITOBA: Part-time or full-time associate required for busy family practice. One or 2 days per week involved at satellite practice located 1 hour from Winnipeg. Reply to: CDA Classified Box # 2751. D306

MANITOBA - Swan River: Associate wanted with view to purchase within 1 - 2 years. Well-established, busy general practice in west-central farming

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This requirement will be advertised on the Government Electronic Tendering Service (GETS), provided by MERX, telephone: 1-800-964-6379, Internet Address: <http://www.merx.cebra.com> and also in the Government Business Opportunities (GBO) publication. Bid packages are to be purchased through MERX.

For information, please contact:

Barbara McKay
Public Works and Government Services Canada
Phone: (204) 983-3774 Fax: (204) 983-7796

SOLICITATION NUMBERS: H3551-8-009A/A and H3551-8-009A/B*
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D296

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Angela Welton
Director, Clinical Programs, Extended Care
Peace Arch Hospital
15521 Russell Ave.
White Rock, BC V4B 2R4
Fax (604) 541-5835

D316

necessary. Exciting opportunity. Forward resume to: PO Box 2615, Yellowknife, NT X1A 2P9 or fax (867) 873-5032. D267

NORTHWEST TERRITORIES - Yellowknife: Canadian certified dental associate required for a modern family dental practice with pleasant support staff. The clinic is located in the city of Yellowknife. Seeking a caring motivated individual interested in a long-term position. Please reply to: CDA Classified Box # 2705. D012

NORTHWEST TERRITORIES - Kugluktuk: Canadian board-certified dentist required for part-time, full-time position. Emphasis on quality, gentle dentistry. Please apply to: PO Box 274, Kugluktuk, NT X0E 0E0, or fax resume to (867) 982-4512. D162

ONTARIO - Eastern: Associate required for long-term opportunity with ownership/partnership potential. Need an energetic, efficient practitioner with excellent communication skills to start a satellite clinic in a brand new facility. Excellent opportunity for the entrepreneur. Please forward resume to: CDA Classified Box # 2749. D301

ONTARIO - Guelph: We are looking for a highly motivated individual for a part-time associateship in our group practice. We anticipate this leading to full time/partnership. This position involves commitment to work evenings and weekends, and a dedication to clinical excellence and comprehensive patient care. Please reply with resume to: Stone Road Dental Office, 435 Stone Rd. W., Ste. L3A, Guelph, ON N1G 2X6; tel. (519) 836-9330, fax (519) 836-1671. D309

ONTARIO - Niagara Region: Associateship wanted. Experienced general dentist available for full-, part-time or locum practice. Please call Geoff Smith, (905) 468-4985. D307

ONTARIO - Niagara Falls: Associate dentist to accompany me, a well-established, high-gross family dentist, in a modern and progressive dental office. This is an outstanding opportunity for the right individual. I welcome you to join me in this most pleasant setting. The office is conveniently located on a large, separate lot in a prime business area. It is spacious, with all modern updates and a warm and friendly long-time staff. I am anxious to meet anyone already established or newly graduated who is interested in this long-term fulfillment. Please contact me, Bruce Herod, DDS, 3936 Portage Rd., Niagara Falls, ON L2J 2K9; tel. (905) 356-7081. D305

ONTARIO - Ottawa: (1 hour west) Maternity leave replacement required for very busy practice. Four days/week for 6 months starting January 1999. Experience preferred. Part-time associate position available after leave completed. Contact: David, tel. (613) 623-2054 (leave message), fax (613) 623-2058. D313

ONTARIO - Sudbury: Full-time associate required for busy, well-established, five-member clinic. Because of future partnership potential, this is an excellent opportunity for the right individual. Please reply to: CDA Classified Box # 2748. D297

ONTARIO - Toronto Area: Established oral and maxillofacial surgery practice seeking board-eligible/board-certified oral surgeon for associateship leading to partnership. All new modern office. Please reply to: CDA Classified Box # 2753. D320

ONTARIO - Windsor: Come share my practice in this economically booming city. I'm looking for an experienced, motivated, and committed dentist to share and take over my practice within the next 2 years. Contact: Gabe, tel. (519) 974-6120, fax (519) 974-6121, e-mail wnhimpex@ican.net D300

ONTARIO - Toronto: Cost-sharing opportunity. Looking for dentist with existing patient base who wishes to relocate in downtown Toronto practice. Excellent staff, strong hygiene program. Across from the Faculty of Dentistry. For further information, please contact: Karen, tel. (416) 597-0411. D279

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ONTARIO - Cambridge: Endodontist - excellent opportunity! Full or part time in well-established, new facility, multispecialist office. Growing community of 102,000. General anesthesia available. No investment required. Please contact: M. Viol, tel. (519) 623-3810 or fax (519) 623-1760. D240

ONTARIO - Ottawa: Full-time associate needed, with future partnership potential. Days and evenings. High gross practice located in superb, self-standing, brand new facility on major street. Bilingualism an asset. Call (613) 748-8266, fax (613) 745-3305. D235

QUÉBEC - Région Lanaudière: Super opportunité. Dentiste recherché. Temps plein (30 à 40 heures/semaine). Grand flot de patient. Possibilité d'association. Personne dynamique et impliquée demandée. Contactez: Dr. David Lelièvre au (450) 961-1616. D315

QUEBEC - Montreal: (Rivière des Prairies) Dentist wanted with experience for percentage work in an expanding, ultramodern office. Available Fridays and Saturdays. Excellent opportunity. Trilingualism an asset. For more information call (514) 648-7211. D322

YUKON - Whitehorse: Two associateships available in 3-year-old dental practice. Cost sharing partners are booking 3 months in advance and are seeing new patients daily. Individuals with a caring nature, high ethical standards and strong clinical and communication skills will enjoy tremendous success in serving this wonderful community. Please send resume with references, to: Dandelion Dental Clinic, Attn: Jane, 206 Lowe St., Suite D, Whitehorse, YK Y1A 1W6; tel. (867) 667-7227. D265

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BOOK REVIEWS

ADA Guide to Dental Therapeutics

edited by

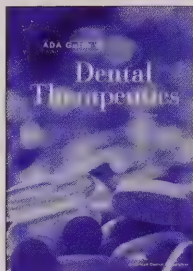
Sebastian G. Cianco, DDS

1998, ADA Publishing Co., Inc.

Chicago, Ill., 616 pages;

\$59 (U.S. - non-members)

ISBN: 1-891748-00-9



This book is offered as a resource that dentists and dental students can rely on for information on the drugs used in dentistry and medicine. Its stated objective is to be "more than a dictionary and yet not a textbook of pharmacology."

The book's editor correctly states that it does not replace pharmacology texts, but builds on basic knowledge. It is divided into three sections: drugs used in dentistry; drugs used in medicine; and drug issues in dentistry. There are helpful tables that summarize dosage, interactions, precautions,

and contraindications for each drug group.

The book's strengths are that it is very well organized, clearly written, and contains well-designed summary tables which present a large amount of information succinctly. Both the editor and the contributors should be complimented on accomplishing their objective of providing an easy-to-understand resource.

Unfortunately, the book has several weaknesses as well. The target audience is the American dentist or student. Although the book denotes the drugs that are only available in Canada, many of the trade names it lists are only available in the United States, and there is no means of identifying which ones are not available here.

Most of the large amount of material contained in this book is accurate, but there are several errors in content. For example, the chapter on conscious sedation and agents for the control of anxiety contains information that is either dated or not specific to dentistry. The dosage recommendations for benzodiazepines list regimens for the daily control of anxiety, which is not relevant to the practice of dentistry. This section is somewhat disappointing, given that two of the

contributors to other chapters in this book, namely Drs. John Yagiela and Stanley Malamed, are experts in this particular field. With all respect to the author of this chapter, it may have been more appropriate for either Dr. Malamed or Dr. Yagiela to have written this section.

Other areas of concern include misleading comments about dental procedures requiring steroid supplementation; the inappropriately little importance given to the antibiotic clindamycin; and the inaccurate information provided on several other antibiotics. There are also a small number of discrepancies between the information presented in the summary tables and the data described in the text. In the appendix, there are a number of misleading sample prescriptions for pain relief, infection, and sedation, which highlight regimens that are inconsistent with current recommendations.

Should a Canadian dentist purchase this book? Possibly, as it is very well organized, and presents the pharmacology relevant to dentistry in a clear manner. These advantages are negated to a small degree by the sporadic presence of inaccurate items or misleading content in the text. Hopefully, these inaccuracies will be corrected with the next update, which is planned in two years. This book does not replace reference texts such as a current *Compendium of Pharmaceuticals and Specialties* (CPS) or the *United States Pharmacopeial Drug Information for the Health Care Professional*. It does, however, provide an alternative resource, which facilitates our understanding of the dental relevance of drugs. This book does have value as a supplement to the dentist's personal library, provided that there is an awareness of its limitations.

Reviewed by:

Daniel Haas, DDS, PhD, FRCD(C)
Toronto, Ont.



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Journal

July-Aug.
1998
Vol. 64
No. 7

The TMD Controversies — A Second Opinion

Ray Mulrooney, DDS, B.Sc.D., FICCMO

At various times in the past 40 years, a variety of dental and medical specialists have included the management of temporomandibular disorders (TMD) in their scope of practice.

During this period, several theories on TMD management have been advanced. Many of these theories, which had no scientific basis to begin with, have subsequently been shown to be off the mark and discarded.

TMD is an extremely complex condition, with a multifactorial etiology. Asserting that it is unrelated to occlusion, as some specialists have done, implies that the laws of physics do not apply to the structures of the mouth. This assertion is invalid. Bear in mind that the mandible meets the cranial base at the two temporomandibular joints and at the occlusion of the teeth, forming a tripod, and that it is not possible to move one foot of a tripod without affecting the other two. Essentially, it is not possible to alter the occlusion of the teeth without affecting the position of one or both of the condyles relative to the cranial base. If the change in the position of the condyles is within the adaptive capacity of the joints and/or the related musculature, no symptoms result. If this adaptive capacity is exceeded, however, the cluster of symptoms that we call TMD may ensue, along with structural

changes such as the internal derangement of the joints and the functional retraction of the mandible, to name only two.

In his January 1998 article, Dr. Goldstein¹ correctly stated that "scientifically based practice... requires the practitioner to continuously update and implement their (sic) knowledge."

However, he also states that a National Institutes of Health report and the guidelines issued recently by the dental regulatory authorities in Ontario and B.C. "clearly reflect the important movement away from irreversible dental procedures." He contends that the term TMD "reflects the present understanding of a variety of conditions, most of which are minor and self-limiting, and do not require invasive treatment," that only "a very small number of TMDs are associated with correctable structural abnormalities that cause pain and dysfunction....," that most "TMDs are not associated with correctable structural conditions," and that "large numbers of TMD cases are chronic in nature." According to Dr. Goldstein, "the vast majority of TMD cases get better without treatment," and "proper care often involves less physical treatment and more management with multiple modalities, including patient counselling and education."

Many dentists who have been treating TMD for years have reached different conclusions from those now being promulgated by numerous academics, however.

This disagreement is rooted in the perception of practising dentists that much of the science on which the academics' opinions are based is highly questionable. Moses² has shown that the epidemiological model of investigation cannot be applied effectively to a condition such as TMD, which has a multifactorial etiology and a wide variety of presentations, and offers no objective criteria on which to base judgment.

Internal derangements as well as signs of osteoarthritis, myalgia and myositis sometimes occur with TMD, and can be objectively demonstrated. It seems unlikely that patients could think these conditions into existence, which may be why academics have responded by ascribing them to "parafunctional" activity such as bruxism. This in itself seems to contradict the conclusions that dentists are being asked to accept.

Oral pathologists are currently viewed as the ranking specialists in the TMD field. The reason for this escapes me, since there is nothing in the training of pathologists that specially qualifies them to be experts on a condition within the realm of physiology, or, if we accept their parafunctional

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theory, psychology. In fact, their conclusions on TMD seem to nullify their claim to expertise.

The ongoing efforts to impose the academics' views on the profession and the public, culminating with the NIH-Food and Drug Administration (FDA) conference in October 1994, are of even more concern. Although well designed and well controlled studies were presented that provided evidence for different conclusions, it was obvious that the conference was rigged from the outset to produce the desired result. Incontrovertible proof of such rigging was presented, and resulted in the dismissal of the chairman and one eminent consultant, as well as the reprimand and dismissal of several employees of the United States government who were shown to have colluded in it.

For those of us who have been treating TMD for many years, and enjoyed a gratifying degree of success (along with enough failures to keep us humble), the attempt to force widespread acceptance of the academic consensus on treatment is appalling. For starters, the evi-

dence is based on a scientific method that is not appropriate to the subject matter. Second, the specialists in question have no claim to expertise by virtue of their specialty. Third, their conclusions beg a number of important questions, including: what causes intraarticular damage in the absence of external trauma?; why do tension headaches disappear for many patients when the position of the mandible is corrected (or, to use a neutral term, altered)?; why does repositioning the mandible appear to result in improvement of body posture in many patients?; and many others. The usual answer is "the well-known placebo effect," but these effects are seen too often for this explanation to be tenable. In short, acceptance of this "science" requires a great leap of faith — one that many of us are unable to make.

As for the electronic instrumentation that many practitioners are finding useful: jaw tracking instruments, electromyographs, and sonographs, they are just tools. Nobody advocates their use in lieu of a careful history and exam-

ination. They are very much like X-rays, and have exactly the same limitations. Still, many reputable and highly competent operators use them, and get excellent results; but the tools themselves are neutral. They are measuring devices, and whether or not what they measure is useful, the fact that they do what their manufacturers' claim is no longer in dispute. The statement that neither these instruments nor mounted study models have any diagnostic validity is fatuous in the face of the excellent clinical results documented by practitioners who have used them.

Clinical sciences proceed by a modification of the classical experimental method, in which operations are performed, the results observed, and tentative conclusions drawn. These conclusions, based on clinical experience, are applied to similar cases, and must be modified if facts come to light that show them to be inadequate. Thus a scientific method, based on this type of experimentation, is applied.

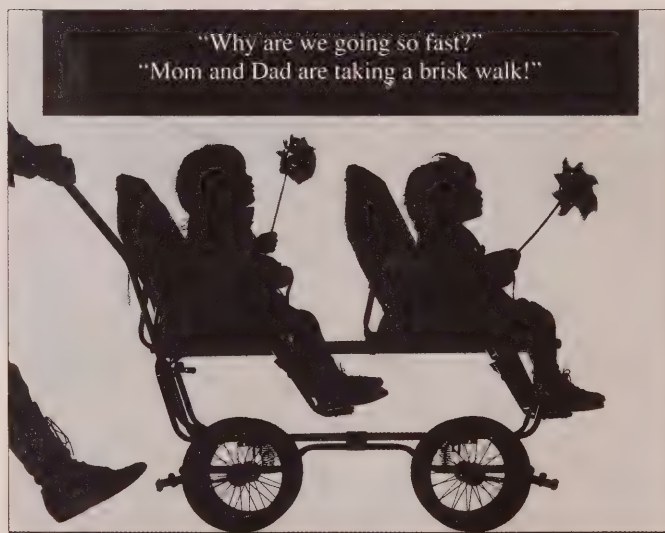
Conversely, clinical sciences do not proceed by epidemiological studies that lack objective criteria, particularly when they are investigating a condition that is known to have many factors involved in its etiology. In fact, without such criteria and a well defined etiological agent, such studies are without value.

Clinical sciences most definitely do not proceed by attempts to impose the conclusions reached by such methods by controlling the refereed journals to prevent publication of dissenting views, nor by political manoeuvring to discredit the dissenters. ■

Dr. Mulrooney maintains a private dental practice in Toronto.

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1. Goldstein, Burton H. The TMD Controversies [It's My Opinion]. *J Can Dent Assoc* 64:65-66, 1998.
2. Moses, Allen J. Scientific Methodology In Temporomandibular Disorders. Part III: Diagnostic Reasoning. *Cranio* 12:259-265, 1994.



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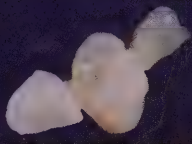


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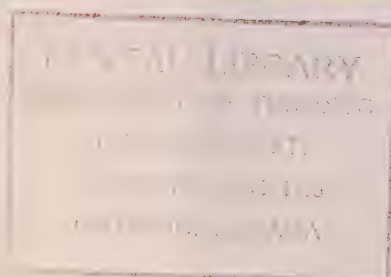
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Subscriptions are for 11 issues, conforming with the calendar year. All 1998 subscriptions are payable in advance in Canadian funds.
In Canada — \$50 (+ GST); United States — \$72; all other — \$80.
Notice of change of address should be received before the 10th of the month to become effective the following month.

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Journal

Canadian Dental Association

SEPTEMBER 1998
VOL. 64, No. 8

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The *Journal of the Canadian Dental Association* is published in both official languages — **except scientific articles which are published in the language in which they are received**. Readers may request the *Journal* in the language of their choice.

ISSN 0709 8936
PRINTED IN CANADA



"Vers l'île du moulin," oil on canvas by Dr. Pierre-Yves Lamarche



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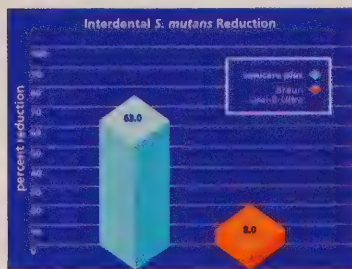
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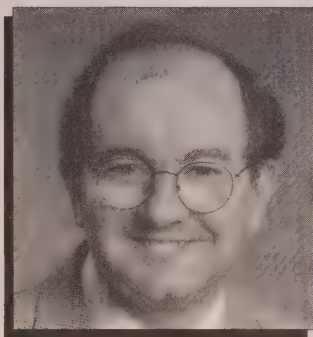
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EDITORIAL

QUALITY INFORMATION FOR SOLVING CLINICAL PROBLEMS



Dr. John P. O'Keefe

Picture a dentist, confronted with a particular clinical problem, sitting in front of a computer in the office and retrieving the information needed to solve that problem with a few clicks of the mouse. Fantastic you say? Not so. Medical and dental students today, are being taught to search for information from huge databases to help them solve clinical problems.

As we develop the *Journal*, I believe we should keep in focus the goal of providing "information to solve problems." Every change we make will be geared toward helping you find useful information and assess its quality. You may notice some changes in the *Journal* this month. These initial changes are intended to make the publication more readable.

The *Journal* will evolve as we strive to make the CDA an integrated source of useful clinical and scientific information. By this, I mean that the *Journal* will be developing even closer working relationships with the CDA Resource Centre, Professional Services Department and Conventions Department to bring you information

that will help you practice good dentistry.

The On-Line Journal

The on-line version of the *Journal* is now accessible from the public side of the CDA web site (www.cda-adc.ca). Initially, we will be posting full-text scientific and clinical articles under the "Current Issue" and the "Back Issues" sections of the site. There are also links to additional information for readers, authors, subscribers and advertisers.

Please visit the site and give us your feedback. This site will grow and develop in the months ahead. Your feedback will help it improve. I believe that electronic publishing has the potential to revolutionize the way the *Journal* does business. In the future, I can see us publishing shorter articles in the print version of the *Journal*. The on-line version can be the vehicle for extra information that authors want to convey to interested readers.

Thinking Of Our Readers

Beginning this month, we are changing the format for presenting abstracts of articles. We hope the busy reader can skim through the abstracts and quickly get the essentials of the information contained in the articles. Wherever possible, abstracts will be "structured" with subheadings. Applied research articles will have a feature that indicates their clinical significance.

The key words that appear at the end of abstracts are Medical Subject Headings (MeSH). These are the terms that Medline, the information database run by the National Library of Medicine in the U.S., uses to classify medical and dental articles. If you search Medline, using these key words, you will retrieve articles that are similar to those presented in our *Journal*. We include this feature to help readers find additional information about subjects that interest them.

In addition, the *Journal* sends each author of a clinical or scientific article a questionnaire asking them to disclose any financial interest in companies making the

types of products mentioned in their article. Starting this month, we will include a statement at the end of each article indicating the authors' responses to the questionnaire. I believe that transparency in the issue of financial interest is helpful to our readers.

A Message To Authors

For the past few editions, we have not placed advertisements in the body of clinical or scientific articles. I know this is important in terms of citations and reprints. We hope to continue with this policy. Shorter articles will make it easier for us to succeed.

The impact factor of a journal is an important consideration for university-based authors when they are deciding where to submit manuscripts. Our journal does not have an impact factor because the Institute for Scientific Information (ISI) hasn't indexed it since 1977. The ISI has agreed to evaluate the *Journal* with an eye to potentially indexing it again. I believe our dental faculty members will be crucial to the development of the *Journal*. You know how we can develop an impact factor. Let's do it!

To ensure that articles are of high quality, we subject them to peer review. At present, we are devising a new peer review process that will be clear to all. We are also conducting some experiments to see if we can speed up the process. Starting this month, we will clearly indicate which articles have been peer reviewed.

You Know What You Need

The information needs of readers must drive this *Journal*. One of the initiatives I am taking to assess these needs, is to set up an e-mail contact network. This network will include representatives from all groups in the profession, across Canada. I urge the presidents, deans, registrars and executive directors of all dental organizations in the country to nominate a contact person for the *Journal*. I look forward to hearing from you.

John O'Keefe
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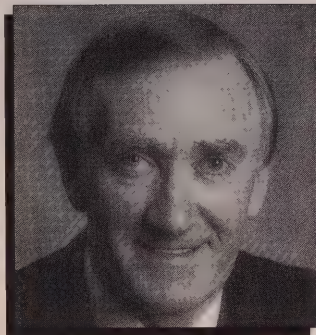
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PRESIDENT'S COLUMN

THANK YOU FOR THE OPPORTUNITY



Dr. Toby Gushue

It is hard to believe that, just about a year ago, I was writing my first President's Column and getting ready to assume my responsibilities as president of CDA. Many past presidents told me at the beginning of my year, that I would be amazed how quickly the year would pass. They were right!

As I look back, I see another busy year of CDA activities, supported by a host of dedicated volunteers and an excellent staff at headquarters.

We began the year by holding a joint planning session with our corporate members. At this meeting, we asked our partners to tell us what CDA should do, and be, on behalf of organized dentistry. We talked about the membership issue and the need for every dentist in Canada to contribute to the costs of the national programs that CDA provides for the entire profession.

If we are to continue as a strong and vital organization, we must formalize a membership structure that will preserve CDA's ability to speak as the authoritative national voice of the Canadian dental profession. As the profession's authoritative national voice, CDA speaks for every dentist in Canada, and we have been busy doing just that.

This year, again, we brought dentistry's message to the House of Commons Standing Committee on Finance, regarding the taxation of dental plan premiums. Our position on this issue was reflected in the 1998 federal budget, when Mr. Martin extended the tax deduction on these premiums to non-incorporated, self-employed Canadians. With this measure, the minister effectively withdrew the threat of taxing dental plan premiums. This is a real achievement by CDA!

As I have said many times before, this victory for CDA is worth several times the cost of our annual membership fee. Yet this was not all we accomplished during the past year. We managed other national issues that are vital to our profession.

CDA worked hard on the issue of preventing the transmission of blood borne pathogens from health professionals to their patients. When Health Canada's Laboratory Centres For Disease Control (LCDC) were putting together a report on this topic, we forcibly articulated the dental profession's viewpoint, based on scientific evidence.

A CDA opinion, dissenting from LCDC recommendations about mandatory immunization and testing of health care workers, was published as an addendum to the final report. While supporting the intent of the report, CDA believes that the transmission of blood borne pathogens can be more efficiently and effectively prevented through voluntary measures. Our profession is, as always, a leader in the field of prevention.

We continued to speak strongly about Native Canadians' reduced access to optimal oral health care and the administrative nightmare associated with the Non-Insured Health Benefits Program. We have fought managed dental care to a virtual standstill in Canada and have preserved fee-for-service dentistry in this country. These are just a few of the issues that CDA

has been managing on behalf of all dentists this year.

I want to use this opportunity to thank the many people who have worked so hard on these issues, helping to make my term as president so rewarding.

I extend special thanks to my colleagues on the management committee and executive council for their wisdom, guidance, and dedication in dealing with complex issues during this past year. I also want to thank the numerous volunteers who serve on our committees. These are the people who work the issues and develop the motions for presentation to executive council and the board of governors. It is so important to recognize their generous efforts.

CDA is blessed with a loyal, dedicated staff under the leadership of our executive director, Jardine Neilson and directors, Brian Henderson, Linda Teteruck, Joel Neal, Sandra Davis, and James Gagnon. We are served very well by our staff. I want to thank all of them for their help, with particular thanks to Terry Davis, for editing my columns and drafting my speeches during this past year.

This year has been personally fulfilling for me. I have had the opportunity to travel across this country and meet hundreds of colleagues who are working unselfishly for their profession in local component societies and provincial associations. What I will take most from this year is the memory of these wonderful people.

I extend my sincere best wishes to Dr. Dick Sandilands as he assumes the office of president. With him and his colleagues, Drs. John Diggins and Burton Conrod, as members of the management committee, CDA can look forward to strong leadership in the future.

Finally, to all the members of CDA, thank you for the opportunity to have served as your president. It has been a great experience.

*Toby Gushue, BA, BA (Ed.), DDS
President of the Canadian Dental Association*

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LETTERS



Editor's Comment

The Journal welcomes letters from readers about topics that are relevant to the dental profession. The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the Canadian Dental Association. Letters should ideally be no longer than 300 words. If what you want to say can't fit into 300 words, please consider writing a piece for our "Debate" feature.

Office Overhead Disability Insurance

I am writing to inform readers about an issue with my office overhead disability policy which may be relevant to others.

I hold a policy of this type with Aetna Life Insurance Co. In November 1996 I was diagnosed with brain cancer and have been unable to work since. I arranged for a friend to act as a locum in my practice until I sold it in November 1997. From the time my disability began until the practice sale was completed, I received no monthly payments for office overhead costs from Aetna.

The policy was sold to me on the understanding that costs not related to production were covered. Any costs related to productivity such as lab bills, sundries and locum fees were not covered. I understood this clearly from the policy and the claim form. However, when I submitted a claim, the insurance company insisted on knowing the locum fee and the monthly productivity, indicating that this would have to be deducted from fixed expenses. I have received no monthly pay-

ments from the company. The issue is now in the hands of my lawyer.

I would encourage all practitioners to carefully review their office overhead disability insurance policy with regard to the coverage and exclusions.

Larry K. Janyk, DMD
Kamloops, BC

One Up For CDSPI

It is with interest I watch the ongoing mudslinging between CDSPI and Dr. Murray Chantler (via Oral Health).

My personal involvement is a partial disability claim after an Achilles tendon tear in January 1998. I carry two insurances, one with Sun Life, arranged through CDSPI and the second through Aetna.

To date (August 1) I am still awaiting settlement from Aetna after many letters, faxes, personal interviews, financial reports, phone calls etc. Sun Life, on the other hand, settled quickly with no hassles, as of June. CDSPI followed up with a satisfaction survey, independent of Sun Life. Now that's performance!

Conrad B. Sonntag, B.Sc., DDS
Redcliff, Alta.

Something To Talk About

I disconcertingly read Dr. Luc Dugal's "Something To Talk About", in the June edition of the *Journal*, trying to decipher his intended message. Given Dr. Dugal's position with the CDA and the CDA commitment to promoting increased communication between dentist and patient, his concerns I take as well intended. However, there is a cynical tone, perhaps fueled by his personal experiences in Alberta, that I take issue with.

As a member of the Nova Scotia Dental Association, I am presented each year with a fee guide that is based on sound economic research gathered in a number of provinces, such as Nova Scotia, Saskatchewan, British Columbia and until recently Manitoba. I find it

interesting that dentists in these provinces have a high degree of satisfaction with and adherence to our recommended fee guides, while the provinces Dr. Dugal mentions are struggling with this issue.

Because of dentistry's unique fee-for-service delivery system, the value of our services must be considered from a number of perspectives. Dental services are a consumer commodity competing in a marketplace for discretionary dollars. The fair market value is what our fee guide committee essentially estimates, given the overall economic conditions and the costs of practicing dentistry.

Beyond the market value of dentistry, and essentially more important is the value a practitioner and his/her patients place on attaining and maintaining optimum oral health.

These perspectives are not mutually exclusive. However, the opinion that fee guides deprive dentists of fully appreciating the value of their service is, I feel, a weak argument for their abolition. In fact, a well developed fee guide used by dentists to assist in the establishment of his/her fees actually frees the practitioner to concentrate on other aspects of practice management and patient education.

Dean P. Miller, DDS
Dartmouth, NS

Dr. Dugal's Response

The intent of my article was to initiate dialogue among dentists which I believe is also a mandate of the CDA. I practiced dentistry for twenty-five years with a fee guide and it served me very well. The argument isn't whether or not fee guides deprive dentists of the potential to maximize value for their services, but whether current fee guides really do what they initially were intended to do.

Dr. Miller makes the point that there is a difference between the market value of dentistry and the value dentists and patients place on "attaining and maintaining

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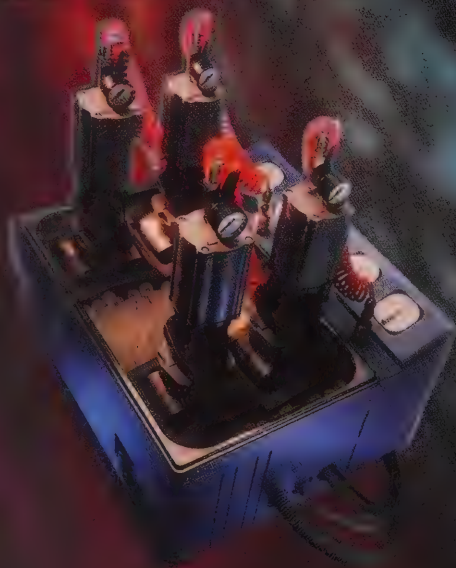
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optimum oral health." The message in my article was that fee guides have unwittingly contributed to the demise of that distinction by removing the individuality that should exist in setting the final fee in a dental office.

Dentists are taking the easy way out by using fee guides as schedules rather than guides. Consumers individually, or through their dental plans, also adopt this "fee schedule" mentality questioning fees differing from those in the provincial fee guides. That is what I find disconcerting and potentially dangerous. It is a small step for dental organizations to fall out of favor with consumers and for other organizations to come forward and establish their fee schedule as the standard.

The answer does not necessarily lie in abolishing fee guides but in educating dentists and consumers about how fees are set. Dental associations should continue to estimate the market value of dental services and publish broad guidelines that help determine fees. They should also encourage dentists to develop their own fees, based on their individual circumstances, using these broad guidelines.

This means educating dentists how to determine fees and providing them with the data required to evaluate their practices against certain economic benchmarks. While most provincial dental associations describe the fees in their guides as being "suggested fees", I don't think that any of them pursue a policy of actively encouraging members to set their own fees.

Luc Dugal, DMD
Calgary, Alta.

www.canaden.com

Three years ago, a group of dentists in Ontario made a decision to embrace digital communications, the Internet and online continuing education. The product of their commitment, and that of industry and grass roots members, is on view at www.canaden.com.

One of the primary features of this website is the facility to create

and house electronic listservs for any dental society, study club, fraternity or organization in this country, at no charge. Lists can literally be created in minutes. A group just needs to nominate a list administrator, who contacts the canaden site to initiate the list. The list administrator only needs to have rudimentary computer knowledge.

The responsibility of list administrators is to control the registration and involvement of list users. They control who can receive messages from the list. They alone can access the names and addresses of list members, if that level of security is required. Subscription or removal from a list is by automated form and done by the registrant. Abel Computers and Patterson Dental provided the server and the ISDN line that enabled the integration of the Lyriss automated mailing list software into this website.

Another feature of the web site is the first all-Canadian Internet based dental associate/locum registry. You can look for or find an associate or locum simply by posting your information to the site. Need to find a speaker or a course to take? Check out the site's *Continuing Education* area. Want to find a site on a medical condition afflicting a patient? Go to the *Nexus* area of the site. The links provide a wealth of useful and interesting information. Come on-board for the journey of a lifetime!

Kenneth S. Serota, DDS, M.M.Sc.
Mississauga, Ont.
kendo@inforamp.net

A Suggestion For the Journal

I would like to be able to open the *Journal* and see brief articles stating the most up-to-date, research-supported recommendations for a

... Continued on page 598

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NEWS UPDATE

CDA Code Of Ethics Recognized

In his 1997-1998 report, federal privacy commissioner Bruce Phillips commended CDA's Code of Ethics for its commitment to ensuring the confidentiality of patient records. Mr. Phillips noted that CDA's code stands as an example that health information codes are "both desirable and doable with members' commitment." Mr. Phillips also commented that the association's efforts "underscore its ongoing commitment to its patients' interests."

CDA's guidelines on personal data protection were approved by the board of governors in 1997. They recognize that dental records are collections of sensitive personal patient information compiled to allow dentists and other

dental care providers to provide dental treatment, provide continuity of care and maintain optimal standards of health. (More information can be found in the July-August issue of *Communiqué*.) ■

Sudden Infant Deaths Possibly Related To Retroposition Of Maxilla

A recent study published in the *British Medical Journal* tested the hypothesis that victims of sudden infant death syndrome have back set maxillae and mandibles which predispose them to occlusion of their upper airways. The study examined facial bone structure in 15 infants who had died of the syndrome and 15 aged matched controls. The researchers found an increased frequency of sudden infant death syndrome in infants of families with the obstructive sleep

apnoea/hypopnoea syndrome. They also found that retroposition of the maxilla was a common feature in families who had both the obstructive sleep apnoea/hypopnoea and sudden infant death syndrome. In addition, they found that obstructive apnoea in adult family members of patients with the obstructive sleep apnoea/hypopnoea syndrome were related to the retroposition of the maxilla and mandible. The complete study is available on the *British Medical Journal* web-site at: www.bmj.com. ■

Symposium To Be Held On Geriatric Care Of the Future

The first annual symposium, "Geriatric Care: Considerations For the Future", will be held in North York, Ont., on October 16, 1998. The program will bring together a wide-range of experts in the field of geriatric dentistry who will speak on a variety of subjects including: impact of dental disease on seniors, oral pathology in the aging population, periodontal disease in the elderly and the future of geriatric dentistry. One of the goals of the symposium will be to establish a Canadian chapter of the American Society of Geriatric Dentistry. More information is available through the Education Department of the Baycrest Centre for Geriatric Care: (416) 785-2500, ext. 2365. ■

Two Dental Implant Companies Join Forces

Swedish based Nobel Biocare recently acquired U.S. based Steri-Oss. The acquisition makes Nobel Biocare the largest provider of dental implants in the U.S. and a market leader in Germany. According to company officials, the acquisition will result in a more comprehensive line of dental implants on the market. Following the acquisition, Nobel Biocare will market three brand names within the area of dental care: Brånemark System and Steri-Oss for dental implants and ProCera for prosthetics. ■



"Vers l'île du moulin" 24" X 30", oil on canvas.

Cover Artist: Pierre-Yves Lamarche

This month's featured artist is Montreal born, Pierre-Yves Lamarche, a respected artist and dentist. Dr. Lamarche practised dentistry for more than 17 years in Montreal prior to his recent retirement. Today, he completes more than 50 oil paintings a year including portraits, city scenes, still lifes and landscapes.

His work has been exhibited in Quebec and France, and has been featured in several prominent art magazines. Dr. Lamarche is also a sculptor and poet. ■

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Health Canada Releases Resource Kit To Assist Health Professionals

Health Canada recently published a resource kit entitled *Medication Matters: How you can help seniors use medication safely*. This resource kit was developed to assist health professionals working with seniors and it combines information about literacy, clear verbal and written communication techniques and safe medication use. The kit includes three information sheets, written in an easy-to-read conversational style that will help health professionals discuss medication topics with patients. It also includes some take-home pamphlets for seniors, on how to use medication safely.

Medication Matters is available on the Internet site of the Division of Aging and Seniors, Health Canada at: <http://www.hc-sc.gc.ca/seniors-aines> or can be ordered by contacting the Division of Aging and Seniors at: (613) 952-7606 or e-mail: seniors@hc-sc.gc.ca ■

APPOINTMENTS

NSDA Appoints New President



Dr. Noel Andrews

At the recent annual meeting of the Nova Scotia Dental Association, Dr. Noel Andrews was inducted as the 109th President of the NSDA. A native of St. John's, Nfld., Dr. Andrews is a graduate of Dalhousie University's faculty of dentistry. Dr. Andrews maintains a private practice in Kentville, N.S. and is also an Associate Professor in the Periodontics Division of Dalhousie's faculty of dentistry. He will serve as NSDA President for the 1998-99 term. ■

Ontario Dentist New VP Of Academy Of General Dentistry

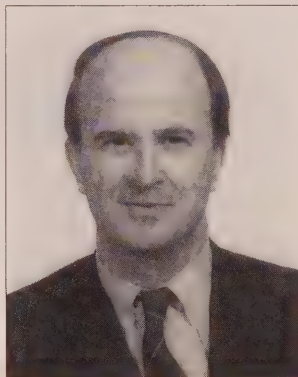
Dr. James Walsh of Perth, Ont., was recently elected vice-president of the Academy of General Dentistry. A graduate of McGill University's faculty of dentistry, Dr. Walsh has maintained a pri-

vate general practice in Perth, since 1970. He is also the attending dentist at the Great War Memorial Hospital in Perth, and at the Smiths Falls Community Hospital in Smiths Falls, Ont. ■



Dr. James Walsh

Academy Of Prosthodontics Elects New President



Dr. George Zarb

At its recent 80th annual meeting, the Academy elected Dr.

George Zarb as its president. Dr. Zarb is associate dean clinical services, professor and head of prosthodontics at the University of Toronto. He is a past-president of the Association of Prosthodontists of Canada and past co-president of the International College of Prosthodontics. He is also a co-founder of both organizations. Dr. Zarb is the recipient of numerous teaching and research awards, including three honorary doctorates. ■

BC Dentist Elected President of IFEA

Dr. Fred Weinstein of Vancouver, B.C. was elected president of the International Federation of Endodontic Associations at its fourth World Congress held in Israel. Dr. Weinstein is a graduate of the University of Manitoba faculty of dentistry and completed graduate work in endodontics at the University of Pennsylvania. He is a past-president of the Canadian Academy of Endodontics and of the B.C. Society of Endodontics. Dr. Weinstein was also assistant clinical professor at the University of British Columbia, faculty of dentistry from 1969 to 1986.



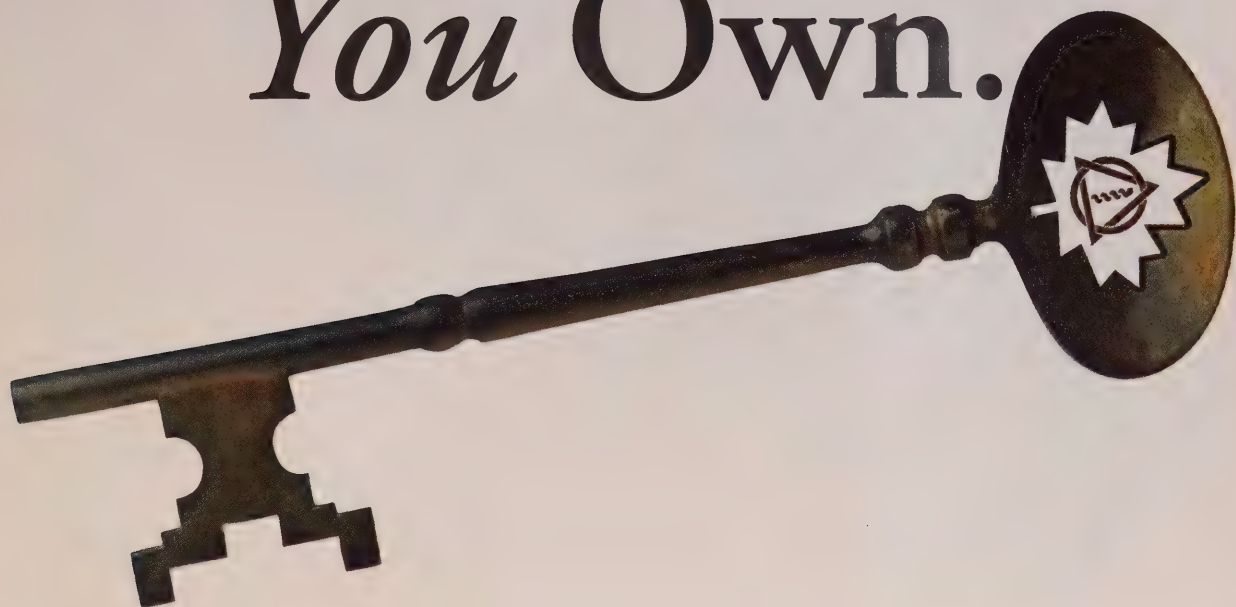
Dr. Fred Weinstein

OBITUARIES

Badner, Dr. Manly G.: A 1954 graduate from the University of Toronto's faculty of dentistry, Dr. Badner, of North York, Ont., died in May of this year.

Bloom, Dr. Lou: A 1943 graduate from the University of Alberta's faculty of dentistry, Dr. Bloom, of Vancouver, B.C., died in February

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of this year. He was a life member of CDA.

Boston, Dr. John A.: A 1965 graduate from the University of Toronto's faculty of dentistry, Dr. Boston, of St. Catharines, Ont., died in July of this year.

Chadwick, Dr. B.S.: A 1933 graduate from the University of Toronto's faculty of dentistry, Dr. Chadwick, of Etobicoke, Ont., died in February of this year. He was a life member of CDA.

Craig, Dr. Cameron A.: A 1950 graduate from the University of Toronto's faculty of dentistry, Dr. Craig, of Peterborough, Ont., died January 7, 1998. He was a life member of CDA.

Curry, Dr. Charles W.: A 1960 graduate from Dalhousie University's faculty of dentistry, Dr. Curry, of Halifax, N.S., died in April of this year.

Ditchoff, Dr. John T.: A 1950 graduate from the University of Toronto's faculty of dentistry, Dr. Ditchoff, of Mississauga, Ont., died in February of this year.

Fedoruk, Dr. Samuel: A 1959 graduate from the University of Toronto's faculty of dentistry, Dr. Fedoruk, of Etobicoke, Ont., died in January of this year.

Ferland, Dr. Luc: A 1963 graduate of the faculty of dentistry at l'Université de Montréal, Dr. Ferland, of Lantier, Que., died in March of this year.

Harrison, Dr. C.C.: A 1945 graduate from the University of Alberta's faculty of dentistry, Dr. Harrison, of Edmonton, Alta., died in January of this year.

Intrater, Dr. Alfred: A 1955 graduate from the University of Toronto's faculty of dentistry, Dr. Intrater, of Toronto, Ont., died in March of this year.

King, Dr. I.S.: A 1936 graduate of the University of Toronto's faculty of dentistry, Dr. King, of Toronto, Ont., died in April of this year.

Lamb, Dr. Roland T.: A 1939 graduate of McGill University's faculty of dentistry, Dr. Lamb, of Montreal, Que., died in July of this year.

McLeod, Dr. Kent D.: A 1996 graduate from the University of Saskatchewan's faculty of den-

tistry, Dr. McLeod, of Trenton, Ont., died in April of this year.

Marchand, Dr. Jacques: A 1938 graduate from the Université de Montréal's faculty of dentistry, Dr. Marchand, of Saint-Laurent, Que., died in April of this year.

Mitchell, Dr. Harold: A 1932 graduate from the University of Toronto's faculty of dentistry, Dr. Mitchell, of Winnipeg, Man., died April 15, 1998. He was a life member of CDA.

Pierce, Dr. Frank L.: A 1953 graduate from the University of Alberta's faculty of dentistry, Dr. Pierce, of Duncan, B.C., died in April of this year. He was a life member of CDA.

Plunkett, Dr. Luke J.: A 1963 graduate from the University of Toronto's faculty of dentistry, Dr. Plunkett, of Vancouver, B.C., died April 13, 1998.

Simpson, Dr. W.: A 1950 graduate from the University of Alberta's faculty of dentistry, Dr. Simpson, of Edmonton, Alta., died February 17, 1998. He was a life member of CDA.

Szarka, Dr. Peter: A 1964 graduate from McGill University's faculty of dentistry, Dr. Szarka, of Victoria, B.C., died in January of this year.

Wilson, Dr. Albert J.: A 1955 graduate from the University of Toronto's faculty of dentistry, Dr. Wilson, of Windsor, Ont., died in March of this year. He was a life member of CDA. ■

ERRATUM

In the second last paragraph (p. 482) of Dr. Donald Rife's "It's My Opinion" article entitled "The Truth About Fee Guides" published in the July-August edition of the *Journal*, we inadvertently transcribed the year "1999" as "1998." The paragraph should have read: "Approaching a millennium (on whatever date you choose), with trepidation that a fee guide is an impediment to free enterprise, certainly encourages the concept of transferring personal responsibility to someone or something else. What an illusion has been performed by the author. One should dedicate more rightful and imaginative concern to determining if his or her computer, and those of the banks, insurance companies and particularly dental plan administrators will crash at the stroke of midnight, December 31, 1999." The *Journal* regrets the error. ■

INFORMATION PACKAGE

September 1998

This month's package contains a selection of reading materials on AIR ABRASION. It is available to CDA members for \$5.00 plus applicable tax.

A complete list of information packages is available upon request by calling 1-800-267-6354 or can be easily accessed on the CDA web site at www.cda-adc.ca. Once inside our site, please log into the "CDA Members" area and click on "Resource Centre" and a list of packages can be viewed.

New Acquisitions

Carroll, Jim and Broadhead, Rick. Good health online: a wellness guide for every Canadian, Prentice Hall, 1997.

Hall, Walter et al [editors]. Decision making in dental treatment planning, 2nd ed. Mosby, 1998.

Becker, Adrian. The orthodontic treatment of impacted teeth. Mosby, 1998.

Nevins, Myron and Mellonig, James T. [editors]. Periodontal therapy: clinical approaches and evidence of success. Quintessence, 1998.

Miller, Chris H. and Palenik, Charles John. Infection control and management of hazardous materials for the dental team, 2nd ed. Mosby, 1998.

Cohen, Stephen and Burns, Richard C. [editors]. Pathways of the pulp, 7th ed. Mosby, 1998.

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SELF-LEARNING SELF-ASSESSMENT

The SLSA Program is published as a monthly feature in the *Journal of the Canadian Dental Association* as a resource for dentists wishing to enhance their dental knowledge and expertise. It is intended as a vehicle for self-learning and self-assessment. The program is based on a series of 40 questions, answers, rationales and references, followed by an annual 15-question quiz. All material is based on current referenced literature.

The 15 questions and answers to the June 1998 SLSA Quiz appear below. The names of all dentists who returned their completed Quiz response card to CDA's national office prior to August 31, 1998 will be forwarded to their respective provincial licensing bodies for consideration. All 10 provincial licensing bodies currently recognize the SLSA program. However, the number of continuing education points awarded by each licensing body may vary. Dentists should contact their provincial licensing body for more information.

The 1998-1999 SLSA Program begins in this issue, with five new questions. The correct answers, rationales and specific references will be provided in the October 1998 issue. Keep all copies of the *Journal* so you can correctly respond to the June 1999 quiz.

QUESTION 1

Patients receiving chemotherapy usually develop ulcerations on the oral keratinized mucosa.

Granulocytopenia is a secondary effect of chemotherapy.

- A. The first statement is true, the second is false.
- B. The second statement is true, the first is false.
- C. Both statements are true.
- D. Both statements are false.

ANSWER: B

QUESTION 2

You are determining a patient's periodontal status using the periodontal screening and recording method (PSR). The distolingual score on tooth 1.7 is code 4. You would

- A. continue examining tooth 1.7.
- B. proceed to tooth 1.6.
- C. proceed to teeth 1.6, 1.5 and 1.4.
- D. proceed to the next sextant.

ANSWER: D

QUESTION 3

An overdenture using decoronated teeth

- 1. provides for improved retention.
- 2. creates a more favorable crown/root ratio of the retained teeth.

- 3. gives proprioception through the periodontal ligament of the retained teeth.
- 4. demands careful oral hygiene by the patient to avoid caries.

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4
- D. 4 only
- E. All of the above.

ANSWER: E

QUESTION 4

In the dental office, effective cardiopulmonary resuscitation (CPR)

- 1. can only be achieved if the patient is flat.
- 2. requires that the head be no higher than the heart.
- 3. provides circulation of blood to vital organs.
- 4. requires external compression over the xiphoid process.

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4
- D. 4 only
- E. All of the above.

ANSWER: A

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QUESTION 5

Aging of facial tissues results in

1. loss of muscle tone.
2. more exposure of the teeth when smiling.
3. ptosis of the skin.
4. decreased fatty deposits.

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4
- D. 4 only
- E. All of the above.

ANSWER: B

QUESTION 6

The NSAID keterolac (Toradol) 10 mg given orally will provide your patient with more effective analgesia than

1. acetaminophen 1000 mg.
2. acetylsalicylic acid 650 mg plus codeine 60 mg.
3. acetaminophen 600 mg plus codeine 30 mg.
4. ibuprofen 400 mg.

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4
- D. 4 only
- E. All of the above.

ANSWER: E

QUESTION 7

The use of a sharp explorer to detect fissure caries is contraindicated.

Fissure caries when limited to enamel can best be diagnosed from a radiograph.

- A. The first statement is true, the second is false.
- B. The second statement is true, the first is false.
- C. Both statements are true.
- D. Both statements are false.

ANSWER: A

QUESTION 8

Which of the following constitute the "biologic width" of the periodontium?

1. The gingival sulcus.
2. The junctional epithelium.
3. The supracrestal connective tissue fibres.
4. Alveolar crestal bone.
5. Periodontal ligament.

- A. 1 and 2
- B. 1, 2, 3
- C. 1, 2, 3, 4
- D. All of the above.

ANSWER: B

QUESTION 9

In the absence of clinical mobility the most frequent finding(s) in a vertical root fracture of a tooth is/are

1. a deep, isolated periodontal pocket.
2. swelling.
3. a fistula.
4. spontaneous sharp pain.

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4
- D. 4 only
- E. All of the above.

ANSWER: A

QUESTION 10

A dentin bonded composite resin is superior to amalgam as a retrograde root filling material because it

1. seals more effectively.
2. is not cytotoxic.
3. demonstrates better postoperative healing.
4. can be applied in a "wet field".

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4
- D. 4 only
- E. All of the above.

ANSWER: B

QUESTION 11

Chlorhexidine varnishes

1. are applied to all tooth surfaces.
2. effectively reduce numbers of *S. mutans* organisms
3. should only be reapplied when *S. mutans* levels remain high in the saliva.
4. are not advocated for chronic gingivitis.

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4
- D. 4 only
- E. All of the above.

ANSWER: E

QUESTION 12

Resin modified glass ionomer cements are biotherapeutic since they release fluoride during the initial set.

Resin modified glass ionomer cements can be used as fissure sealants.

- A. The first statement is true, the second is false.
- B. The second statement is true, the first is false.
- C. Both statements are true.
- D. Both statements are false.

ANSWER: C

QUESTION 13

Metronidazole may be prescribed

1. for pregnant patients.
2. p.o. 500 mg every 8 hours.
3. p.o. 500 mg every 12 hours.
4. for certain periodontal conditions.

- A. 1, 2, 4
B. 1, 3, 4
C. 2 and 4
D. 3 and 4
E. 4 only.

ANSWER: C

QUESTION 14

Secondary effects of chemotherapy may be

1. xerostomia.
2. taste changes.
3. opportunistic infection.
4. gingival bleeding.

- A. 1, 2, 3
B. 1 and 3
C. 2 and 4
D. 4 only
E. All of the above.

ANSWER: E

QUESTION 15

The resin modified glass ionomer cements (RMGIC)

1. incorporate a light curing system for initial set.
2. are not suitable as luting cements.
3. can be used in Class III and Class V preparations.
4. are not recommended in the primary dentition.

- A. 1, 2, 3
B. 1 and 3
C. 2 and 4
D. 4 only
E. All of the above.

ANSWER: B

1998-1999 QUESTIONS**QUESTION 1**

In a pregnant patient, which of the following is the highest risk factor for the delivery of a premature, low birth-weight baby?

- A. Alcohol consumption
B. Smoking
C. Periodontal disease
D. Dental caries

1. Periodontal screening and recording (PSR) examination.
2. Placement of orthodontic brackets.
3. Local anaesthetic injection for an inferior dental nerve block.
4. Intraligamentary local anaesthetic injection.
5. Placement of rubber dam.

- A. 1, 2, 3
B. 1 and 4
C. 1, 3, 5
D. 1, 4, 5
E. All of the above

QUESTION 2

In periodontal surgery the modified Widman flap, when compared to a full thickness flap

1. gives a more pleasing esthetic result.
2. allows for more exposure of the alveolus and the roots of the teeth.
3. results in a more stable treatment outcome.
4. results in a less stable treatment outcome.

- A. 1, 2, 3
B. 1 and 3
C. 2 and 4
D. 4 only

QUESTION 3

A patient presents with a heart murmur and mitral valve regurgitation. Which of the following clinical procedures require(s) prophylactic antibiotics to prevent endocarditis?

QUESTION 4

In which clinical situation(s) would you place an immediate implant for a permanent maxillary central incisor?

1. A traumatically avulsed tooth just lost.
2. A traumatized tooth with a vertical fracture line extending into the apical two thirds of the root.
3. An endodontic failure showing an area of apical rarefaction.

- A. 1 only
B. 1 and 2
C. 2 only
D. 2 and 3
E. 3 only
F. All of the above

QUESTION 5

Which of the following characteristics of cut dentin will affect local adhesion of dentin bonding restorative materials ?

1. Density of dentinal tubules.
2. Dentinal tubular length and size.
3. Degree of dentin sclerosis.
4. Smear layer.

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4
- D. 4 only
- E. All of the above

The SLSA program is a resource and service, directed to the dental profession and the licensing authorities, which is intended to help dentists achieve and maintain the high levels of expertise and competence identified by Canadian dental licensing authorities. SLSA program material is based on current literature and is intended to teach and cause reflection on everyday clinical procedures. Since its inception, SLSA has been designed to provide material which will update general practitioners in new and practical methods, in order to enhance patient care.

In consultation with selected general practitioners and specialists from across the country, the SLSA Program is developed and produced by a core group consisting of:

G.S. Beagrie, DDS (Edin.), FRSCS (Edin., Eng.), FRCD(C). Former Dean, Faculty of Dentistry, University of British Columbia.

K.C. Bentley, DDS, MD, C.M. Cert. Oral Surg. Former Dean, Faculty of Dentistry, McGill University.

G. Kravis, DDS. Former Executive Director/Registrar, National Dental Examining Board of Canada.

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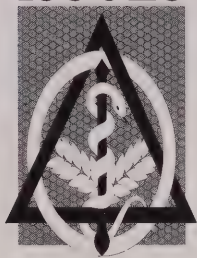


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PROFESSIONAL ISSUES



Dentistry At the Top Of the World

Dan Morrow, DMD, PhD, Cert. Perio.

Nawang Doka Sherpa, RDT

W. H. Fallon, DMD

ABSTRACT

This report provides a brief description of the Khumbu region of Nepal, its people, and the availability of dental treatment in this remote area. It also highlights Canadian involvement in the training of dental staff who provide treatment in a new clinic in the region.

© J Can Dent Assoc 1998; 64:558, 560.

The Region and Its People

The Khumbu region of Nepal is the homeland of the famous Sherpa people and is the site of the world's highest point, Mount Everest at 8,848 m. Four other mountains in this area have elevations in excess of 8,000 m including Lhotse (8,501 m), Makalu (8,475 m), Lhotse Shar (8,384 m) and Cho Oyu (8,153 m), which places them among the eight highest peaks of the world. The Khumbu area extends between the Tingri region of Tibet and the confluence of the Dudh Kosi and Bhote Kosi rivers. The main villages lie at altitudes of up to 4,200 m and temporary summer settlements (yarsa) are located above 4,900 m.

The Sherpas, who started migrating from Tibet to the Khumbu region of Nepal somewhere between the 12th and 15th centuries A.D., have a highly specialized adaptation to living at this extreme elevation and in conjunction with their moral fibre, reliability and personal charm are highly respected by those who have had the opportunity to know these people.¹ Since roads and vehicles do

not exist in the Khumbu the principal means of transportation for the Sherpas is walking, however yak and their cross-breeds are also used for transporting goods and occasionally carrying people in emergency situations.

Dental Treatment In the Region

Dental treatment in the Khumbu was virtually non-existent, other than by home remedies, prior to 1966 when a hospital was built as a Sir Edmund Hillary Himalayan Trust project in the village of Kunde. The hospital is staffed by volunteer physicians from either Canada or New Zealand who serve a two-year term on a rotating basis. From the beginning, the hospital provided treatment for dental emergencies, mainly the extraction of teeth. This rudimentary dental treatment helped significantly to establish an appreciation of the hospital among the local residents.²

The concept of building and staffing a permanent dental clinic in the village of Namche was proposed in the late 1980's by Dr. Brian Hollander, an American dentist

working at the American Embassy Dental Clinic in Kathmandu.

Namche is the largest village in the region, with a population of approximately 1,000. It is the main commercial centre of the Khumbu region which has a total population of around 5,000 people. Namche is located at an altitude of 3,450 m and is a two-day walk from the STOL/helicopter runway located at Lukla, a main entry point to the Mount Everest region of the Himalayas.

Some additional emergency dental treatment including extractions and the treatment of acute oral infections had on occasion been provided in the Khumbu by the physicians at the Himalayan Rescue Association Emergency Post at Pheriche. The Himalayan Rescue Association was founded in 1973 and the post at Pheriche was established in 1976, mainly for the treatment of climbers and trekkers, and their education regarding the hazards of acute mountain sickness. The village of Pheriche is located near the base of Mount Everest at an altitude of 4,200 m. The post is staffed by volunteer

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Fig. 1: Dental clinic building, Namche, Nepal.



Fig. 2: Operatory at the Namche Dental Clinic with one of the authors (NDS) examining a young Sherpa patient.

physicians who work only during the main trekking/climbing periods in the spring and fall. Prior to working at the rescue posts, the physicians are given a short orientation to the treatment of dental emergencies and extraction procedures by Dr. Hollander in Kathmandu.³

The New Clinic and Canadian Involvement In Staff Training

Dr. Hollander was well aware of the need for dental treatment in the Khumbu region and he realized the importance of having local Sherpas provide this treatment. The training of local Sherpas to provide the necessary dental treatment would help to ensure both continuity of treatment and provide adequate staffing of the clinic since they would be more likely to remain in the area. He encouraged Ms. Nawang Doka Sherpa from Namche to study dental therapy and funding for her studies was obtained from the American Himalayan Foundation. Ms. Sherpa completed her studies as a registered dental therapist at the National School of Dental Therapy in Prince Albert, Saskatchewan in 1991 and immediately returned to Namche. While she was studying in Canada a dental clinic had been constructed at Namche (Fig. 1) using funds provided by the American Himalayan Foundation and the Everest Marathon.

The Everest Marathon is a full distance marathon held every two years and is run from Gorak Shep, very near the base of Mount Everest, to Namche. It could be considered somewhat of an accomplishment to even get to the starting point of this marathon due to the extreme altitude, let alone participating in the running of the race.

In 1993, Mr. Mingma Norbu Sherpa from the Khumbu village of Khumjung also graduated from the National School of Dental Therapy in Prince Albert, Saskatchewan and returned to work at the dental clinic.

The Namche Dental Clinic is a very modern facility (Fig. 2) with two operatories, reception area, compressor room and storage areas. The clinic provides a range of dental services including consultations, radiographs, restorative and preventive procedures, as well as extractions. It also provides a preventive education program which consists of distributing fluoride tablets and giving oral hygiene instructions to school classes from grades one to five.

The clinic has seen a steady growth in the number of patients treated over the years. Currently, more than seven hundred patients present at the clinic each year. This number is very impressive, considering that for many of the patients the clinic is a three to four day walk through very mountainous terrain. Both the Kunde hospital and the Pheriche rescue post also make every effort to refer any dental treatment to the Namche clinic.

Patients are expected to pay a fee for dental treatment, however this is reduced if the fee is not within their financial means. Foreign mountaineers and travellers are welcomed at the clinic and treatment is provided on a fee-for-service basis. The dental clinic also stocks a small supply of pharmaceuticals and medications that do not require a physician's prescription, for sale to locals and travellers.⁴

The clinic is considered to be a very successful project and has developed into a highly respected health service in the Khumbu region.

It is evident that dental treatment has been well established and is continually being extended to a greater number of patients in this spectacularly beautiful region of Nepal, the results of which are demonstrated in the healthy Sherpa smiles seen at the top of the world. ■

Acknowledgments: The authors would like to acknowledge the arrangements and assistance provided by Everest Trekking Canada and Mr. Gary Coopland, Winnipeg, Manitoba which enabled the preparation of this report.

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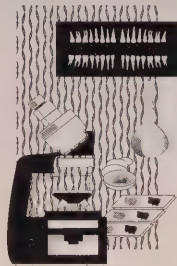
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APPLIED RESEARCH



Fluoride Release From Tooth-Colored Restorative Materials: A 12-Month Report

Y.E.Y. Aboush, BDS, M.Sc., PhD, HD

H. Torabzadeh, DMD, M.Sc.

ABSTRACT

Background

This study measured the amount of fluoride released from three light-activated glass polyalkenoate (ionomer) cements, a conventional glass polyalkenoate, a compomer and a fluoridated composite over a period of 12 months.

Methods

Five discs (7 x 2 mm) of each material were sequentially immersed in 4 mL portions of deionized water at 37°C and before each measurement, the test specimen was rinsed with 1 mL of deionised water. An Orion Model 901 microprocessor digital Ionalyzer was used for the measurements and the data obtained were converted into $\mu\text{g}/\text{cm}^2$. The amount of fluoride released was measured 86 times during the 12-month test period.

Results

It was found that the pattern of fluoride release from the light-activated glass polyalkenoates was similar to that of the conventional glass polyalkenoate. The light-activated glass polyalkenoates, however, released significantly more fluoride than the conventional material. The composite and the compomer released significantly less fluoride than any glass polyalkenoate tested and the difference between the composite and the compomer was not significant.

Conclusion

It was concluded that the light-activated glass polyalkenoates tested released more fluoride than a conventional glass polyalkenoate, a compomer or a composite, and that with regard to fluoride release the compomer behaved more or less like the composite.

MeSH Key Words: glass ionomers; composite resins; fluorides/chemistry; materials testing; comparative study.

© J Can Dent Assoc 1998; 64:561-4, 568

This article has been peer reviewed.

Introduction

Despite gross microleakage at the silicate restoration-tooth interface, a lower incidence of secondary caries in the restored teeth, as well as in teeth adjacent to these restorations has been reported.¹ Such anticariogenic properties of silicate cements were believed to be due to the ability of the material to release fluoride throughout the life of the restoration.²

The pattern and quantity of fluoride released from the conventional glass polyalkenoate (ionomer) cements were reported to be similar to those of silicate cements.² It has also been shown that conventional glass polyalkenoates provided protection against surface and cavity-wall lesions in the restored teeth.³⁻⁶

The preventive effects of fluoride released from silicate and conventional glass polyalkenoate

cements have encouraged dental materials manufacturers to incorporate fluoride in a number of other restorative materials such as amalgam,^{3,7} composite resin^{8,9} and a recently introduced material which has been given the generic name "compomer." These compomer materials are sometimes referred to as "polyacid modified composites" because of their close association with composite resins.

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Table I

Materials Tested For Fluoride Release Over a 12-Month Period

Material	Manufacturer	Description	Batch no.
Fuji Cap II	GC International	Conventional glass polyalkenoate	911225
Fuji II LC	GC International	Light-activated glass polyalkenoate	Powder: 21121 Liquid: 291111
Photac-Fil Aplicap	ESPE	Light-activated glass polyalkenoate	0008
Vitremer	3M	Light-activated glass polyalkenoate	Powder: 33R Liquid: 312
Dyract	De Trey Dentsply	Compomer	921082
Tetric	Ivoclar-Vivadent	Fluoridated composite resin	462084

Table II

Means and Standard Deviations Of the Amounts Of Fluoride Released Over the Last 24 Hours Of the 12-Month Test Period

Material	Mean $\pm$ SD* ($\mu\text{g}/\text{cm}^2$)
Photac-Fil Aplicap	5.0 $\pm$ 0.8
Vitremer	2.5 $\pm$ 0.3
Fuji II LC	2.3 $\pm$ 0.2
Fuji Cap II	1.3 $\pm$ 0.2
Tetric	0.23 $\pm$ 0.02
Dyract	0.21 $\pm$ 0.04

* Values connected by tie lines are not significantly different (Tukey confidence interval = 0.70).

Table III

Means and Standard Deviations Of the Cumulative Amount Of Fluoride Released During the 12-Month Test Period

Material	Mean $\pm$ SD* ($\mu\text{g}/\text{cm}^2$)
Photac-Fil Aplicap	1154 $\pm$ 86
Vitremer	593 $\pm$ 41
Fuji II LC	580 $\pm$ 17
Fuji Cap II	480 $\pm$ 42
Dyract	87 $\pm$ 17
Tetric	22 $\pm$ 2

* Values connected by tie lines are not significantly different (Tukey confidence interval = 85.07).

The manufacturers of the light-activated (resin-modified) glass polyalkenoates claim that these hybrid materials possess similar fluoride release properties to those of the conventional glass polyalkenoates. However, independent

research is required to substantiate these claims.

The aim of this study was to investigate the long-term (12 months) fluoride release from three light-activated restorative glass polyalkenoate cements, a

compomer and a fluoridated composite resin in comparison with that from a conventional glass polyalkenoate. Both the 24 hour and cumulative fluoride release were determined.

Materials and Methods

Five specimens, in the shape of 7 mm diameter and 2 mm thick discs, were prepared from each of the six test materials listed in **Table I**. All materials were dispensed, mixed and light cured, as necessary, in accordance with the manufacturers' recommendations. One end of a 3 cm piece of waxed dental floss was incorporated into each of the disc specimens before the material had set.

Immediately after setting of the material, each specimen was suspended inside a plastic bottle containing 4 mL of deionized water, except for Fuji Cap II where the specimens spent 15 minutes, from the start of mixing, at 37°C and 100% humidity before being immersed in the deionized water.

The plastic bottles containing the specimens were placed in a water bath at 37°C. After 24 hours, each specimen was removed, rinsed with 1 mL deionized water, air-dried using a chip syringe and placed into a fresh 4 mL supply of deionized water. The water used for rinsing the specimen was added to the water used for storage to make the test solution.

The fluoride content was determined using an ion-selective

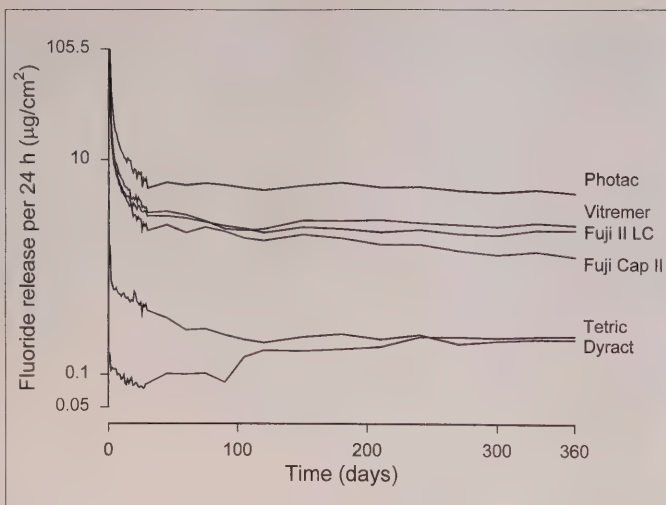


Fig. 1: Fluoride release in 24-hour periods.

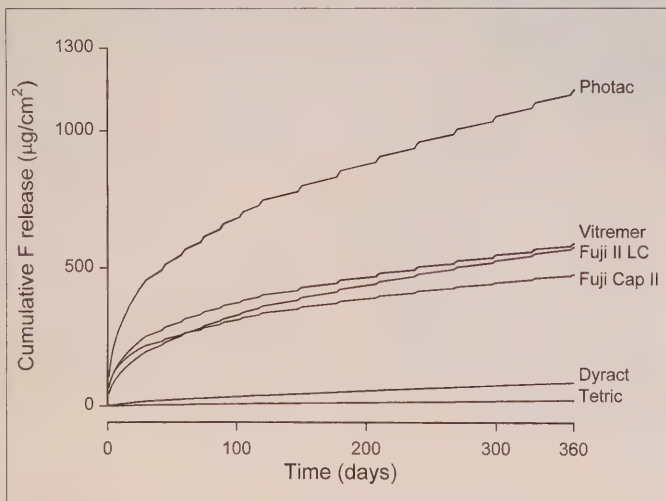


Fig. 2: Cumulative fluoride release.

electrode system.¹⁰ Two milliliters of the test solution were added to 200 µL of 0.1 mol/L hydrochloric acid (Aristar grade: BDH, Poole, Dorset, UK) to achieve a pH of 2. The system was calibrated with fresh standard solutions (1 and 10 µmol/L) prepared by dilution of 0.1 mol/L NaF solution (Orion Research Inc., USA).

The 24-hour regimen of specimen transfer and fluoride content determination was continued for 30 days. On day 31, each specimen was put in 4 mL fresh water and was left there for the next 12 days. After that, the specimens were rinsed, dried and placed in fresh water

every day for three consecutive days. This regimen was repeated six times over a period of three months. For the following eight months, a similar procedure was followed but with 27-day storage periods instead of 12 days. In total, 86 fluoride determinations were made during the 12-month period of the study.

For periods following the first month, fluoride release was determined on the basis of the amount released during the last of the three consecutive days when the specimens had their storage solution changed.



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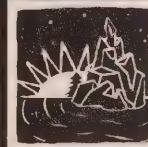


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Results

The fluoride release per 24 hours from the materials, expressed in $\mu\text{g}/\text{cm}^2$, is shown in **Fig. 1**. The fluoride release was high on the first day, fell rapidly over the next day, then gradually decreased to a nearly constant level for all materials except for Tetric where a slight increase was observed before a constant level was reached.

For all materials, the amount of fluoride released was at its highest level during the first 24 hours, followed by a rapid and significant decrease in the next 24 hours, except for Tetric where this decrease was not statistically significant (two-sample t-test at the 0.05 level).

Table II shows the mean amounts of fluoride released from the materials over the last 24 hours of the study period. One-way analysis of variance (ANOVA) indicated a significant difference among the materials ($p < 0.001$). Multiple comparisons between the mean values were then carried out using the Tukey test at the 0.05 level. The results are in **Table II**.

The cumulative fluoride release data for the 12-month period are shown in **Fig. 2** and **Table III**. ANOVA revealed that there was a significant difference among the materials ($p < 0.001$). The results of the Tukey test, applied to the data, are in **Table III**.

Discussion

The techniques used in this study for measuring the fluoride release followed those developed by Tyler and Comer.¹⁰ These workers showed that using a constant pH gives the electrodes an increased affinity for fluoride and greater accuracy at lower concentrations than when using TISAB buffer. However, at high concentrations of fluoride ($> 1 \mu\text{mol}/\text{L}$), both techniques are comparable, but the acid system has the additional advantage of speed, requiring only about two minutes per sample.

All the materials reached constant levels of daily release during the period of this study, though the time to reach this level was different among the test materials. The light-activated glass polyalkenoates reached this constant release

sooner than the conventional glass polyalkenoate. This might be due to differences in the setting mechanisms of these materials.

Photac-Fil Aplicap released more fluoride than any other tested material. A similar observation has been reported by other workers.¹¹ The type of glass used in this cement might be the reason for such comparatively high release. However, insufficient information is available regarding the detailed composition of the various cements to enable a meaningful comparison.

All the light-activated glass polyalkenoates released more fluoride than the conventional glass polyalkenoate, the compomer or the composite. This finding is in line with other work where a light-activated glass polyalkenoate liner was found capable of long-term fluoride release and the amount of fluoride released compared favorably with that obtained from two conventional materials.¹²

It has been reported that the pattern of fluoride release of the light-activated material, Fuji II LC, was virtually the same as its conventional counterpart, Fuji CAP II.¹³ Similar results were obtained in this study. Therefore, it appears that the addition of resins to glass polyalkenoate cements did not affect the fluoride release capability of these materials.

The composite material used in this study, which contained 15% YbF_3 released very little fluoride in comparison with the glass polyalkenoate cements. A similar observation was made with another fluoridated composite containing 5% YbF_3 .¹⁴⁻¹⁶ On the other hand, the amount of fluoride released from the composite resin was similar to that released from the compomer. This implies that, with regard to the fluoride release property, the compomer behaves more like a composite than a glass polyalkenoate cement.

There are two mechanisms of fluoride release from dental restorative materials:

- 1) Dissolution of the material, releasing all its component parts, including fluoride.

- 2) Diffusion, which can be either the release of fluoride in conjunction with an appropriate counter ion, typically sodium, or fluoride release via exchange with hydroxyl groups of the surrounding aqueous environment.

The conventional glass polyalkenoates release via the two mechanisms. The contribution from the dissolution mechanism is greater when the cement is introduced early into water (time < 1 hour), as was the case in this study.

The glass polyalkenoate component of the light-activated glass polyalkenoates releases fluoride in a similar manner to that of the conventional material. The contribution from the dissolution mechanism is, however, very little because of the presence of the hydrophobic resins which will repel the water. Composite resins and compomers release fluoride via the diffusion mechanism.

With all the glass polyalkenoate cements tested, solution fluoride concentration was more than 2 mg/L ($10 \mu\text{g}/\text{cm}^2$) during the first five days, but it dropped below this level soon after. Such relative high initial concentrations in the fluid around a restoration would have a cariostatic effect and also provide a sufficient environment for remineralisation. It was found that 2 mg/L fluoride completely inhibited subsurface lesion formation by the inhibition of bacterial acid production and the interaction of fluoride with the enamel mineral during a 10-day study.¹⁷

Furthermore, it has been suggested that a high concentration of fluoride would be beneficial in microconservative cavities (e.g. tunnel restorations), where carious dentine and/or enamel remain, due to inadequate access.¹⁴ It has also been reported that a fresh glass polyalkenoate cement inhibited the pH fall significantly. However, an artificially aged glass polyalkenoate cement (14 days) was unable to do the same.¹⁸ This is presumably because, by this time the rate of fluoride release is much lower (**Fig. 1**).

An *in vitro* study showed complete protection against secondary



NUTRITION BITES

Let's hear it for . . . Fluorifood

The addition of fluoride to the drinking water in communities certainly has an impact on dental health. But it's interesting to note that the *halo effect* can attenuate the significance. The halo (or diffusion) effect – which results when foods/beverages prepared with fluoridated water are transported to communities without fluoridated water, or vice versa – can influence fluoride intake substantially.^{1,2} For example, in the U.S. and Canada, the consumption of prepared beverages such as soft drinks, juices, tea, and coffee is displacing that of drinking water.^{1,3} At least one study of the fluoride intake of 225 children (aged two to 10 years) has reported that, of the total daily fluid intake (ranging from 970 to 1240 mL/day), beverages other than water accounted for more than 50% (from 585 to 756

mL/day).⁴ As consumption of these beverages increases, fluoride intake may rise or fall according to whether the water source in the beverage was fluoridated.

While most foods have naturally low fluoride concentrations,^{3,5} the actual fluoride content of foods requiring water in their preparation – such as soups, puddings, instant cereals, infant formulas, etc. – depends mainly on the water used. One exception may be tea. Although the fluoride in the water used in brewing tea is certainly significant, tea leaves accumulate fluoride at concentrations ranging from 1 to 6 mg/L depending on the amount and type of dry tea used and the brewing time.^{1,6} Although fluoride concentrations in decaffeinated teas are approximately twice those of caffeinated teas,⁷ it has

been suggested (albeit not proven) that the concomitant ingestion of fluoride and caffeine may increase the bioavailability of the fluoride.⁸ Herbal teas, on the other hand, contain little or no tea and their fluoride content is considerably lower.⁷

Fluoride Concentration of Foods^{1,9}
(average mg/L or kg)

Tea	1.00-6.00
Dairy products	0.25
Fruits	0.06
Grains, cereals	0.42
Leafy vegetables	0.27
Legumes	0.53
Meat, fish, poultry	0.22
Potatoes	0.49
Root vegetables	0.38

Baby-bottle tooth decay

Given the surge in popularity of soy protein-based formulas, the Committee on Nutrition of the American Academy of Pediatrics has examined the issue of infant formula and concluded that, for most babies, formulas with a soy base are no more beneficial than those with a cow's-milk base.⁹ Although information on the cariogenic potential of commonly used infant formulas is sparse, it also appears that, in that respect, those made from soy differ little from those made from cow's milk.¹⁰ In fact, it seems likely that the mode of consumption (i.e., delivery system [cup or bottle], frequency/duration/time of feeding, etc.) – and **not** composition – is the most important determinant of cariogenicity.^{10,11}

In a comparison study of formulas, milk, and sugar solutions using a desali-



To discourage the development of dental caries, non-breast-fed babies should be switched from bottle to cup at about six months-of-age. They should not be given filled bottles for continuous feeding nor fed at bedtime, when salivary flow is reduced.

vated rat model (which best mimics the sleeping infant's virtual absence of saliva), it was found that whereas a sucrose solution was most cariogenic, plain milk was the least. In terms of formulas, those containing sucrose and/or corn syrup solids were **usually** more cariogenic than those containing lactose.¹⁰ But, it was suggested that whether cariogenic potentials are

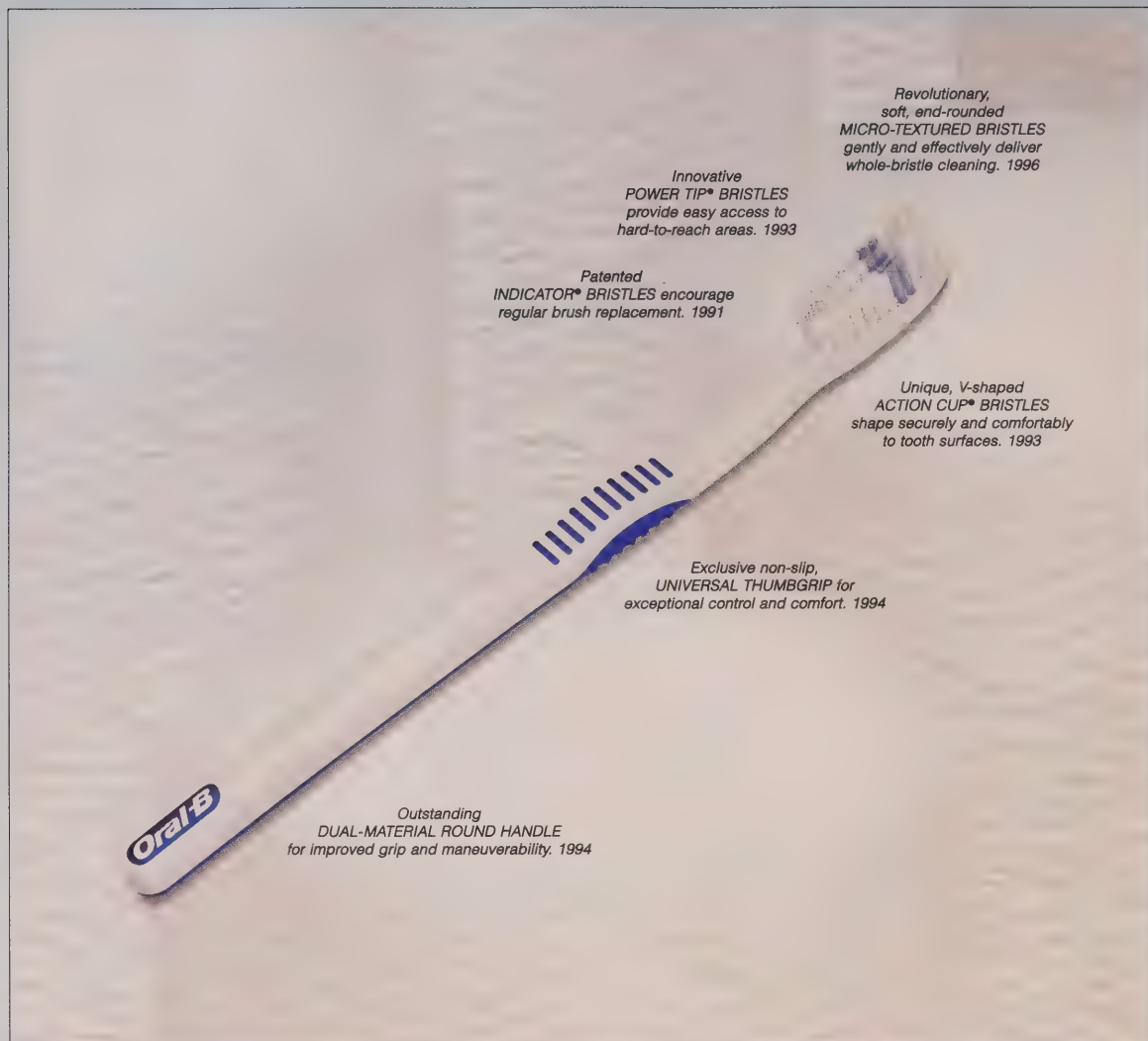
reached depends mainly on the manner in which any product is offered.¹⁰ Another controlled study (n = 19) designed to differentiate the cariogenic effects of mode of consumption from content, compared soy infant formula containing glucose syrup to cow's-milk infant formula containing lactose.¹¹ Plaque pH was measured in adults (since it's impractical and difficult to do in babies) before rinsing their mouths with each of the formulas and then three, seven, 11, 15, 19, 23, and 27 minutes after. There was no significant difference in acidogenicity observed between the soy- and milk-based formulas; neither was particularly acidogenic. However, it was postulated that since the casein contained in milk-based formulas (considered to be one of the ingredients responsible for the caries-protective action of cow's milk) is absent from soy formulas, the latter may have a lower anti-caries potential.¹¹

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lesion formation in cavity walls and a reduction in the extent of lesion formation adjacent to conventional glass polyalkenoate restorations.⁴ Also, it was found that in cavities restored with conventional glass polyalkenoates and subjected to a cariogenic medium, the area of demineralisation was some distance away from the cavity wall and the depth of lesion penetration was less with glass polyalkenoate restorations than with composite restorations containing no fluoride.⁶

In addition, it has been reported that a strong positive correlation was found between the fluoride content of the restorative material and the observed thickness of the surface zone of the outer carious lesion.³ Furthermore, a strong negative correlation was observed between the fluoride content of restorative materials and the extension and penetration of the wall lesions.³ From these *in vitro* findings, it appears that the light-activated glass polyalkenoate cements, which were found to release significantly more fluoride than conventional glass polyalkenoates, should have at least the same potential in protecting tooth integrity as that of conventional materials.

However, the fluoride concentration required to obtain a long-term anticariogenic effect, *in vivo*, has not been established. Furthermore, there is no conclusive evidence to suggest that glass polyalkenoates are significantly better than other materials, in reducing the incidence of secondary caries.¹⁹ Mjör²⁰ looked at the reasons for replacement of restorations in general dental practice in Sweden. He reported that: secondary caries was the main reason for the replacement of amalgam, composite and glass polyalkenoate restorations. He found no statistically significant differences in the diagnosis of secondary caries between composite and glass polyalkenoate restorations. Secondary caries was significantly higher for amalgam restorations than for composite and glass polyalkenoate restorations, and half of the glass replaced polyalkenoates were diagnosed as having

secondary caries. Similar results have been reported by other workers.²¹⁻²³

These findings strongly indicate that the fluoride release from restorative materials is not the sole factor in determining the ability of these materials to prevent secondary caries but, other factors, notably the sealing ability at the margins, play an important role as well. ■

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The authors have no declared financial interest in any company manufacturing the types of products mentioned in this article.

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CLINICAL PRACTICE



Dental Cements: An Update

Derek W. Jones, PhD, FIM, C.Chem. FRSC(UK), FBSE

PRACTITIONER'S QUESTION

In my dental office, we use about 10 different types of dental cement. Which cements are best suited for which application and which cements are most popular?

© J Can Dent Assoc 1998; 64:569-70

Dr. Jones Reply:

The proliferation of cement materials on the market in the past few years can be confusing for the practicing dentist. You point out that you may have as many as 10 different types of cement in your dental office. Perhaps, this is as it should be, as no one material has all of the properties required for every clinical application.

Three International Standards Organization (ISO) classifications have been specified for the use of dental cements: I) luting applications; II) restorative applications; and III) liner or base applications. Some types of cements are supplied in more than one of these three classifications. Selection of cements for particular applications requires knowledge of the chemistry and physical properties of the particular cement type.

The following are examples of the use of various types of cement.

Cement Systems Principally Used For Luting Comprise:

Zinc Phosphate, Zinc Polycarboxylate, Polyalkenoate (Glass Ionomer) Resin Cement, (especially orthodontic appliances) Resin Filled cement, Resin Ionomer Cement (resin modified ionomer).

Cement Used For Temporary Luting Or Temporary Restoration:

Zinc oxide-eugenol, Zinc Oxide EBA (ethoxy benzoic acid).

Pulp Capping and Thermal-Insulating Base:

Calcium hydroxide, Zinc oxide-eugenol.

Cavity Liners and Bases:

Glass ionomer and resin-modified glass ionomer, Polycarboxylate, Zinc oxide-eugenol.

Cementing Veneers and Composite Inlays:

Resin cements.

Root Canal Sealants and Periodontal Dressing:

Zinc oxide-eugenol.

Core Buildup Under a Crown Or Bridge Preparation:

Metal-modified glass-ionomer.

Table 1 lists the names of some commonly used dental cements.

Some Important Points To Remember:

- Only those cements which make use of polyacrylic acid, such as zinc polycarboxylate and glass polyalkenoate (glass ionomer), are capable of providing the carboxylate groups that have chemical adhesion to tooth structure.
- Zinc oxide-eugenol cements can have a detrimental effect on the

setting of some resin systems used in composite materials and have the potential to contaminate tooth surface prior to using bonding agents.

- Glass ionomer cements are unfortunately sensitive to moisture immediately following mixing and during setting. Paradoxically, glass ionomer cements are best placed on moist tooth structure, excessive drying of the preparation is not recommended.
- Conventional glass ionomer cements are very important in geriatric dentistry due to the fact that they can release fluoride and can chemically bond to tooth structure. This is particularly valuable in erosion cavities and root caries situations.
- Resin modified glass ionomer cements generally have a much lower release of fluoride than the conventional glass ionomer materials.
- Creep of cements (continuous permanent deformation under a static force) can be detrimental to the performance of cements in certain clinical situations. The relatively high creep of zinc polycarboxylate cements may not be acceptable for certain fixed orthodontic

Journal

September
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No. 8

appliances or for large (long-span) bridge structures.

- All "conventional" cements have similar low fracture toughness. However, conventional glass ionomer cements are generally stronger than zinc polycarboxylate cements. In contrast, the resin (BISGMA or urethane acrylate) and the resin-modified glass ionomer cements are both tougher and stronger than conventional cements.
- Manipulation of the cement is very important. Variations in the powder/liquid ratio can influence the working and setting time, the consistency and flow, as well as the degree of solubility, erosion, strength and film thickness.

Several cements are now being supplied in capsules containing the pre-proportioned powder and liquid. This system is very convenient and ensures consistent powder/liquid ratios. However, it does take away the flexibility of being able to vary the consistency of the mixed cement to suit specific applications. It also does not provide the latitude for controlling the amount of mixed cement. In addition, small changes in the time of mechanical mixing with the amalgamator can significantly influence the setting of the cement.

Potential Pitfalls

A large number of factors may influence the performance of luting cements. Cementing errors occur due to a range of possible influences such as: incorporating too much or too little powder; premature exposure of the cement to moisture; delay between completion of the mix and seating; room or mixing slab temperature is too high; surface contamination of casting or preparation.

To avoid premature setting of the cement, apply the cement first to the appliance at room temperature and

then to the preparation at mouth temperature. The elevated mouth temperature accelerates the setting of the cement. Cementing problems can occur such as: seating difficulty; loosening of appliances; excessive solubility and disintegration; or too short a working-time.

One method which can aid in the seating of appliances during cementation, is the use of vibration, as well as stress. Careful attention to the above details are required in order to avoid errors in cementation.

Another consideration for larger bridge structures is the question of working-time. The zinc phosphate cements have relatively longer setting time especially when mixed on a cool glass slab.

Interestingly, an evaluation of zinc phosphate cements found them to give a lower film thickness at three minutes compared to earlier times of testing at one, 1.5, two, and 2.5 minutes. The simple explanation being, that the particle size of the zinc oxide powder is reduced with time during the reaction with the acid, and the viscosity changes due to the setting reaction. This allows for a thinner film at three minutes.

I always remind my students, with tongue in cheek, that when all else fails, they should read the instructions. It is extremely important to read the instructions for all the dental materials we use. Keep the instructions with the particular batch of material. From time-to-time, manufacturers may make changes to the instructions, thus with each new package you should read the instructions again to be on the safe side. Follow the manufacturer's instructions for storage and mixing of the material.

Always dispense the powder first, before the liquid, to minimize the loss of water due to evaporation. Always hold the bottle or vial upright to ensure consistent sized drops

when dispensing liquid. Be sure to fluff up the powder in the bottle prior to using the dispensing measuring scoop. Remember, for many cements it can be beneficial to cool the glass slab in the refrigerator prior to mixing, to slow down the reaction rate and increase the working-time.

What Cements Are Most Popular?

There may not be a simple answer to this question, since it very much depends on the type of dental practice you operate. For the permanent cementation of crowns, glass ionomer cements may be the most popular with polycarboxylate and zinc phosphate placed second and third. For bridges, glass ionomer and zinc phosphate are among the most commonly used. The greater rigidity of these cements and lower creep, is particularly beneficial in long-span bridges.

Conclusion

The dentist of 1998 has an excellent range of dental cements available to apply to a wide range of clinical situations. Dentists can rest assured that the zinc phosphate and zinc oxide-eugenol cements which were in use during dental school days are still valuable and very necessary materials in the armamentarium of a busy general dental practice. ■

Dr. Jones is professor of biomaterials, at Dalhousie University, Halifax, Nova Scotia.

The author has no declared financial interest in any company manufacturing the types of products mentioned in this article.

Editor's note: I invite readers to send me questions about clinical problems experienced in everyday practice. I will seek answers to these questions from recognized Canadian experts. You can send me your questions by e-mail, fax or regular mail. I look forward to hearing from you.

Table I

Some Trade Names Of Various Dental Cements commonly Used In Practice

Glass Ionomer	Resin Modified Ionomer	Resin Cement Chemically Cured	Resin Cement Dual Cured	Zinc Phosphate	Zinc Polycarboxylate	Zinc Oxide-Eugenol
Fuji (GC)	Advance (Caulk)	Panavia 21 (J. Morita)	Resinomer (Bisco)	Tenacin (Caulk)	Durelon (ESPE)	Tem-Bond (Kerr)
Ketac-Cem (ESPE)	Vitremer Luting (3M)	Clearfil CR Inlay (J. Morita)	Enforce (Dentsply)	Fleck's (Mizzy)	Tylok Plus (Caulk)	Fynal (Caulk)

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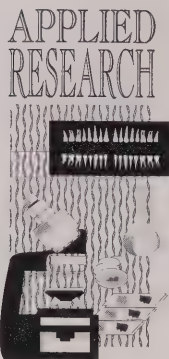
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Outcomes Of the Surgical Exposure, Bonding and Eruption Of 82 Impacted Maxillary Canines

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Claudia Giambattistini, DDS

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ABSTRACT

Background

Advances in bonding techniques and materials allow for reliable bracket placement on ectopically positioned teeth. This prospective study evaluates the outcome of forced orthodontic eruption of impacted canine teeth in both palatal and labial positions.

Methods

Eighty-two impacted maxillary canines in 54 patients were included in the study and were observed for 18 to 30 months after exposure. Following exposure by means of a palatal flap or an apically repositioned buccal flap, an orthodontic traction hook, with a ligation chain attached, was bonded to each impacted tooth using a light cured orthodontic resin cement. A periodontal dressing was placed over the surgical site for a period of time.

Results

All teeth were successfully erupted. Complications consisted of: failure of initial bond, at the time of surgery, which required rebonding; premature debonding at the time of pack removal and; debonding of brackets during orthodontic eruption.

There was no infection, eruption failure, ankylosis, resorption or periodontal defect (pocket greater than 3 mm) associated with any of the exposed teeth. Attached gingiva of less than 3 mm was seen in only two of the buccally positioned canines (9%).

Conclusion

Forced orthodontic eruption of impacted maxillary canines with a well bonded orthodontic traction hook and ligation chain, used in conjunction with a palatal flap or an apically repositioned labial flap, results in predictable orthodontic eruption with few complications.

MeSH Key Words: cuspid/surgery; orthodontics, corrective; tooth, impacted/therapy, outcomes.

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This article has been peer reviewed.

Introduction

The purpose of this study is to evaluate the success of a one-step technique for exposing and guiding into occlusion, impacted maxillary canines. The technique involves using the most recently available bonding materials and attachment devices, in conjunction with a consistent surgical approach.

Teeth may be impacted or erupt ectopically for a variety of reasons. Hereditary factors, lack of space, persistence of primary canines, a true ectopic path of eruption, reduced root length and aplasia of lateral incisors are a few of the factors cited.¹

Ericson and Kuroi² reported that, in terms of the frequency of impaction, the maxillary perma-

nent canine ranks second only to the third molar, with a prevalence of approximately 2% in the general population. Impacted canines are positioned palatally 85% of the time. The frequency of impaction is three times greater in females than males.³ Some patients with craniofacial anomalies, such as cleidocranial dysplasia and cretinism, have multiple unerupted



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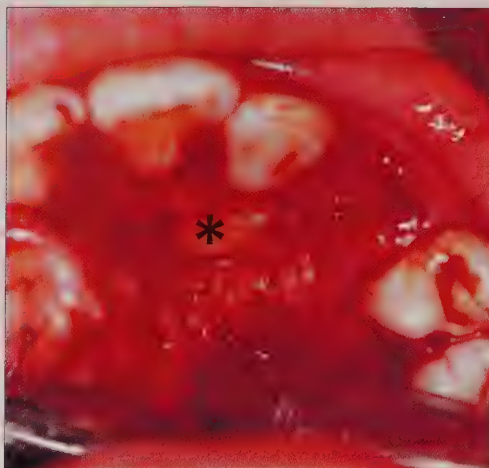


Fig. 1: Extent of a unilateral palatal flap for the exposure of a high impacted canine (*).



Fig. 2a: Labially positioned impacted cuspid exposed with orthodontic attachment in place.

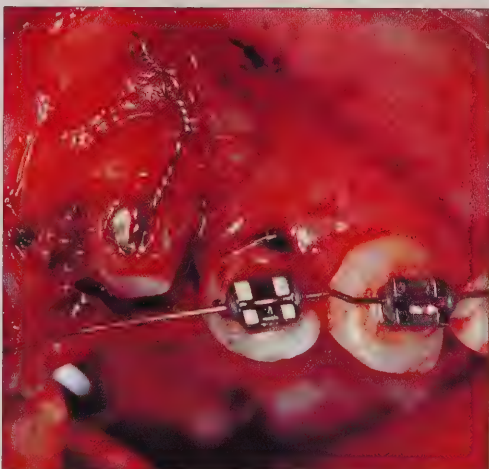


Fig. 2b: Apically repositioned flap sutured into place at the site of a labially impacted canine tooth.



Fig. 3a: Adaptation of light cured periodontal dressing to close a flap of a palatally impacted canine.

teeth. These groups present with specific problems in relation to the timing and nature of treatment.^{4,5}

The location of the impacted canine tooth determines the type of surgical approach. In general, there are three steps to clinical localization.⁶ Visual inspection and digital palpation are the first two steps, while radiographic examination is the third and most critical step. Periapical, occlusal, cephalometric, posterior-anterior and panoramic radiographs, as well as polytomography have all been used to localize impacted canines.^{3,7,8}

Periapical radiographs give a good indication of the labial-palatal location of the canine, relative to the incisors, by means of the

parallax technique (or the Tube-shift technique/Clark rule). The vertex occlusal is the most accurate of the occlusal films for determining the position of the canine, relative to the midline.⁹ Superimposition of structures may make interpretation of this radiograph difficult and unreliable. The lateral cephalogram reveals the anterior-posterior position, inclination and vertical location of the canine. However a 45° oblique cephalometric film may be more accurate, due to reduced double image formation.⁹

The panoramic radiograph, in conjunction with the periapical, or the maxillary oblique radiograph, is the preferred method to localize impacted canines.^{2,6} The

image of a tooth located palatal to the dental arch is relatively magnified, while that of a buccally placed tooth appears diminished.¹⁰ In a study of 109 ectopic canines, researchers could predict the palatal location of impacted canines with an 80% specificity using panoramic radiographs.¹⁰

Various treatment modalities have been proposed to avoid the complications associated with impacted canines.^{3,11,12} These complications include: internal or external resorption; infection associated with partial eruption; loss of arch length; and most commonly, the resorption of the roots of lateral incisors.^{2,13}

Canine impactions may be prevented through early diagnosis.

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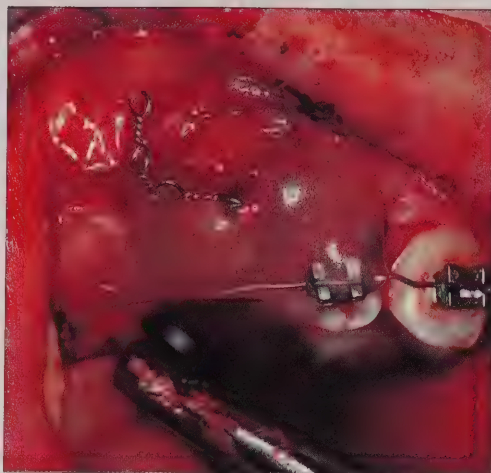


Fig. 3b: Light cured periodontal dressing stabilizing an apically repositioned flap.



Fig. 4: Successfully erupted tooth 13 with health periodontal tissues. The tooth had been labially positioned.

According to Ericson and Kuroi,³ if a maxillary permanent canine appears to be erupting ectopically or not erupting at all, the extraction of the primary canine is recommended in the 10-13 age group. These investigators demonstrated the importance of early diagnosis. In 78% of palatally erupting canines, a normal path of eruption was established within 12 months of removal of the primary canine.

Theofanatos and coworkers¹³ reported that 91% of ectopically erupting canines came into proper occlusion if the canine crown was distal to the midline of the lateral incisor at the time of removal of the deciduous canine. If, however, the crown was mesial to the midline of the lateral incisor root, spontaneous eruption occurred in only 64% of cases.

If prevention is not successful, intervention is warranted. According to Proffitt,¹⁴ there are three categories of problems when dealing with an impacted tooth: surgical exposure; attachment to the tooth and; orthodontic mechanics to bring the tooth into the arch. Bishara¹⁵ advocates the surgical exposure of the impacted canine with no orthodontic traction, only when the tooth has a correct axial inclination. Surgically exposed teeth rarely erupt into a created space, without aid, especially once root formation is complete.³

Numerous surgical techniques have been described to expose impacted teeth.^{6,9,11,16-19} Earlier

techniques were limited by the materials available to bond to the tooth. Wire ligatures and window flaps were originally proposed.^{15,17} These techniques are associated with poor periodontal healing, with loss of attachment, gingival recession, and gingival inflammation.^{15,20} Newer flap designs have resulted in better postoperative periodontal health.^{19,21-23}

As bonding techniques developed in orthodontics, surgical procedures were modified, since less of the impacted crown now needed to be exposed. Newer orthodontic resins have increased bond strengths, decreased setting times and are light cured. Light cured bonding agents compare favorably with those that are chemically cured.²⁴

The application of etch and bonding agents has been improved by making these less sensitive to the moisture of the surgical site. Smaller brackets and improved wires have led to more predictable results. Newer surgical dressings are light cured, have a palliative effect, maintain their position well, are easier to place, adapt flaps better and decrease hematoma formation.^{7,25}

Materials and Methods

This study included 54 orthodontic patients (31 female, 23 male) who were followed for 18-30 months after the surgical exposure of canines. The patients were 12 to 16 years old (mean female=12.7, male=14). A total of 82 impacted

maxillary canines were treated according to a standard protocol. Sixty teeth were palatally impacted and 22 were labially impacted. At the time of surgical exposure, all the teeth had at least one-third to two-thirds of root formation completed. All the crowns of the impacted teeth were covered by bone.

Prior to surgery, the position of the impacted tooth was determined clinically (by palpation) and radiographically (panoramic, lateral cephalogram, two periapicals and maxillary occlusal films).^{9,16,26}

For bilateral palatally impacted canines, a full thickness mucoperiosteal flap was raised from the mesiopalatal aspect of the second premolars. In unilateral cases, the flap extended to the mesiopalatal aspect of the contralateral lateral incisor (**Fig. 1**).

For labially impacted canines, a full thickness mucoperiosteal flap was raised, initially without vertical incisions, from the mesiobuccal aspect of the second premolar to the distolabial aspect of the lateral incisor. Vertical releasing incisions were placed mesially and distally. Sufficient bone was removed from around the crown in order to place a bonded orthodontic appliance. An apically positioned flap was fashioned if the tooth was coronally placed (**Fig. 2**). For deeper impactions, a closed eruption technique was employed.

The enamel was etched for 60 seconds using 37% phosphoric

Table 1

The Nature and Timing Of Complications Presented By Eight Cases Whose Maxillary Canines Were Exposed.

Patient	Complications			Soft Tissue Defects
	Surgical	Post-operative	Orthodontic	
12	+			+
20	+			
30	+			
13		+		
17			+	
44			+	
16				+
36				+

acid. At this point the field was kept as dry as possible using suction and gauze or bone wax. A light cured orthodontic resin cement (Unitek, Transbond XT) was used for bonding (light cured at 470 nm for 40 seconds). The appliance used was a bonded orthodontic traction hook with a ligation chain (**Fig. 2**) (TP Orthodontics).

If the primary canine was present, it was extracted and the wire was passed through the extraction socket (as described by Crescini¹²). The ligation chain was wrapped around the existing labial archwire, or held in place within the periodontal dressing until the orthodontic appliance was placed.

The flap was then repositioned. Labial flaps were apically repositioned ensuring that the full amount of keratinized gingiva was maintained cervical to the crown. Palatal flaps were repositioned to their original site and windows were placed in the mucoperiosteum, for the more medially placed palatal canines, to allow for passage of the wire. Flaps were held in place by means of resorbable sutures.

Subsequently, a light cured periodontal dressing (Barricaide) was placed over the area (**Fig. 3**). The dressing assured patency of the window, aided flap immobilization, and provided protection and comfort for the patient.

Patients were then evaluated 7-14 days after surgery, when the dressing and sutures were removed. Clinical evaluation

included assessment of bracket attachment, eruption status, gingival tissue response, recession, periodontal pocket depth and infection. A radiographic examination with one standard periapical film was performed to assess the status of adjacent structures, as well as the presence of root resorption, ankylosis or periodontal defects.

The patients then had orthodontic traction forces activated within seven to 21 days. At subsequent orthodontic appointments, the same clinical examination was performed with radiological evaluation occurring every three months. Progress was noted and complications were recorded.

Results

All teeth were successfully guided into occlusion. **Table 1** lists the number and type of complications that occurred from the time of the surgery through to the final alignment of the canines. The periods when complications occurred were classified as: surgical, post-operative and orthodontic.

Complications in the surgical stage consisted of failure of the initial bond at the time of surgery. One labial (4.5%) and two palatal (3.3%) canines were immediately rebonded. Bond failure was most often due to the difficulty of obtaining a dry field. Post-operatively, one palatal canine (1.6%) required rebonding when the packing was removed. During orthodontic traction, only one palatal and one labial canine

required rebonding (neither had debonded previously). Clinically, there were no cases of infection, eruption failure, ankylosis, gingival inflammation, or gingival recession. Three labially placed teeth had pockets, greater than 3 mm, five months postoperatively (13.6%). Radiographically there was no evidence of resorption, bone defects or infection.

Once complete eruption was achieved, there were no periodontal defects or pockets greater than 3 mm. All sites had at least a 3 mm band of attached gingiva except for two labially placed canines which had a 1 mm band (9%). Orthodontic treatment continued uneventfully until debonding (**Fig. 4**).

Discussion

During orthodontic treatment, it is particularly important to maintain a healthy band of keratinized gingiva around a labially positioned canine, otherwise the mobile tissue around the tooth may strip away from the crown and root surface leaving a periodontal defect.^{11,14,17,18,22} An adequate band of attached gingiva can be achieved by either apically repositioning a flap with attached gingiva, or by grafting keratinized gingiva from the palate to the site of exposure.

Boyd²⁰ demonstrated that in labially positioned canines, a 2-3 mm band of attached gingiva created by an apically repositioned flap is preferable to a window exposure with no attention to keratinized tissue. This technique results in a significant reduction of gingival recession, inflammation and loss of attachment.

Removing smaller amounts of overlying bone during surgery, results in reduced bone loss after orthodontic treatment.^{14,20,21} The importance of this finding has been disputed,¹¹ especially in the case of palatal impactions, where bone removal may be less critical.

With appropriate handling of the soft tissues during the surgical phase and proper oral hygiene practices postoperatively, the exposed teeth were periodontally healthy in this study (**Fig. 4**). With respect to the management of the soft tissues, the results of the present study are supported by those of other investigators.^{11,17,18,20,22}

The closed eruption technique that was used on the palatally impacted teeth and on some that were labially impacted, produced favorable results. Vermette and coworkers¹⁹ comparing the closed eruption technique to that using apically repositioned flaps, found that closed eruption produced more favorable esthetics, less crown length exposure and a similar periodontal outcome.

Many methods of attaching "hardware" to teeth have been described.^{6,11,20,29} Originally, wire ligatures were placed around the crown of the impacted tooth but, this had the potential to upset the periodontal attachment.²⁶ Boyd²³ compared wire ligation to bonding brackets on palatally impacted canines. In general, the wire ligated teeth had a greater incidence of non-eruption, ankylosis, external root resorption and loss of attached mucosa, due to the larger flaps required.

Before the development of bonding, retentive pins were drilled into the teeth. From these pins, wires were suspended to drag the teeth into occlusion. The risk of pulpal injury, limits the use of this technique today.¹⁴ A preferable approach is to expose an area of the tooth and bond a hook or button attachment at the time of surgery. With the advent of rapid light-curing orthodontic resins, which are as effective as self-cured resins,²⁴ the surgeon is now in a position to place the attachment in the most ideal location.

Lewis⁶ originally advocated a two-step approach for the attachment to the canine. First, the tooth was exposed and packed. Second, after three to eight weeks, the pack was removed by the orthodontist and the bracket was placed. Premature loss of the pack and closure of the defect often occurred prior to the orthodontic visit.

With the bracket attached to the tooth during the surgical procedure, the flap is repositioned over or around the exposed canine. The wire already attached to the bracket is then brought up to the archwire for stabilization and attachment. The use of a traction wire tunnelled through the extraction socket was found to be effective, in this study and in others.^{12,19}

Ideally, mechanical traction should be activated immediately after surgery and the force should be applied to an existing fixed¹⁴ or removable appliance.¹¹ Traction in this study was activated within 7-14 days post operatively. This delay did not produce any long term orthodontic or periodontal complications. Several wires or elastomeric threads were used during this traction phase.

Other techniques to guide eruption include: special alignment springs called Ballista springs (if brackets are already in place in the buccal segments); coil springs; power chains; or loops of ligature wire extending from the canine to the archwire.^{1,9,15,20} Magnets have recently been used to produce eruptive forces.^{28,29}

Complications in treating impacted canines include failure to erupt,¹⁵ periodontal defects,^{21,22,30} bond failure,^{15,20,23} and ankylosis.^{3,20,23} The effect of ankylosis is to prevent tooth eruption. This may cause the anchoring teeth, on the archwire, to tip into the space created for the canine. Ankylosis has also been implicated in some cases where the canine initially moved and then suddenly ceased to erupt. Luxation of the ankylosed tooth has been a recommended treatment in this case however, success is unpredictable.⁹

In this study, all of the 82 impacted canines treated, erupted. This success rate may be partly due to early diagnosis and to the age of the patients. It is recommended to treat this condition before the age of 20, to maximize the potential for success.³¹

The frequency of bond failure, the most common complication observed in this study, was minimal. Other studies have not addressed the problems of bracket detachment, which may not be a significant factor if the bracket is bonded well at the initial surgical procedure.

Where a dry field can't be attained, the bonding of brackets is unpredictable. In this situation, alternative materials such as light cured and chemically cured glass ionomer cements (Fuji Ortho LC) or a 4-meta resin cement (C&B Metabond, Parkell), could be used. This study did not evaluate the relative effectiveness of such

materials, although this could be the subject of a future study.

A rigid light cured periodontal dressing, such as the Barricaide used in this study, can be kept in place for up to two weeks postoperatively (Fig. 3). The dressing may be useful in maintaining the patency of the exposure of palatally impacted canines and in adapting an apically positioned labial flap. In this study, the one premature debonding observed at the time of follow-up was easily rebonded, because the dressing maintained a clean tunnel to the tooth.

Barricaide, a visible light cured periodontal dressing material, exhibits superior physical properties and ease of handling, as compared to standard, chemically cured, dressing materials. It maintains its tensile strength even when immersed in water. It can be placed in the embrasure spaces to increase its retention, although etching adjacent enamel and applying a bonding agent has also been proposed.²⁵

In an animal histologic study comparing different dressing materials, Barricaide, which was present for two weeks showed no deleterious effects on healing.³² In this study, the membrane was retained in all patients for the first postoperative week. The good soft tissue healing, lack of infection and hematoma, as well as flap adaptation made the dressing a helpful adjunct.

Clinical Significance

- The exposure of impacted canines with the use of a palatal flap or an apically repositioned labial flap allows predictable orthodontic eruption with minimal complications.
- Newer light-cured bonding agents provide quick and dependable bonded attachments to enamel.
- A prefabricated orthodontic attachment allows ease of placement.
- Light-cured rigid elastic packing materials produce favorable soft tissue results. ■

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The authors have no declared financial interest in any company manufacturing the types of products mentioned in this article.

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Glazing and Finishing Dental Porcelain: A Literature Review

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ABSTRACT

Background

Dental porcelain has found an increased number of applications in recent years with the development of new methods for the construction of porcelain veneers and intracoronal restorations. In addition, it is used in metal-ceramic and all-porcelain crowns and bridges for the restoration of anterior and posterior teeth.

Methods

This paper presents a review of a number of studies that have examined the visual and microscopic appearance and roughness of glazed, unglazed and polished porcelain surfaces using techniques such as, scanning electron microscopy and surface profilometry.

Findings

All have agreed that glazed porcelain provides a smooth and dense surface. Many have shown that polishing can produce an equally smooth surface, which may even be esthetically better. Some studies supported the use of polishing as an alternative to glazing. However, reports have shown that unglazed porcelain is more abrasive than glazed.

Clinical Significance

This paper aims to guide general practitioners in the proper polishing of adjusted porcelain in the dental office. The recommendations of various authors are summarized in Table I.

MeSH Key Words: dental porcelain; dental polishing/methods; surface properties.

© J Can Dent Assoc 1998; 64:580-3

This article has been peer reviewed.

Introduction

The use of ceramic materials in dentistry can be traced to 1728, when Fauchard suggested its use to restore teeth. Since that time, many in-vitro and in-vivo trials have been conducted for the purpose of improving porcelain to satisfy the cosmetic, mechanical and physical require-

ments of a restorative material. Glazed porcelain is the restorative material that least encourages plaque accumulation and allows plaque to be easily removed. Glazed porcelain can also duplicate natural tooth surface lustre and characterization.

This paper reviews the literature on one aspect of the clinical

handling of dental porcelain — how to refinish porcelain when the glaze has been removed during adjustment. We present information about the effect on opposing dental structures of unglazed porcelain, glazed porcelain, and porcelain that has been refinished by various techniques.

Glazing and Its Significance

Ceramists classify the various stages of the firing or sintering, of dental porcelain as:

1. low bisque — the porcelain surface is very porous and will easily absorb water soluble dyes;
2. medium bisque — the porcelain surface is still porous and shrinkage will have taken place;
3. high bisque — the porcelain surface is now sealed and strong enough to be corrected by grinding prior to final glazing.¹

The aim of glazing is to seal the open pores in the surface of a fired porcelain. Dental glazes are composed of colorless glass powder, applied to the fired crown surface, so as to produce a glossy surface.¹

The adjustment of a porcelain restoration, for occlusal or contour correction, may have an unfavorable secondary impact on the neighboring teeth, depending on the location of the adjustment. The adjusted rough surface may lead to abrasive wear of the opposing dentition or increase the rate of plaque accumulation.^{2,3} Unglazed or trimmed porcelain may also lead to inflammation of the soft tissues it contacts.⁴ Trimming of porcelain may cause some reduction in the strength of a ceramic restoration.^{5,6}

Occlusal contacts between unglazed porcelain and opposing unglazed porcelain or enamel are undesirable because of the high rate of wear of enamel and porcelain.⁷ Early researchers agreed that re-glazing was necessary after porcelain adjustment in the clinical setting.⁸ Many dentists therefore, prefer the porcelain surface of a restoration to be glazed (or re-glazed) prior to cementation.⁹

Polishing Versus Glazing

A number of more recent studies have suggested that a polished surface may be as acceptable as a glazed surface.¹⁰ Many ceramists prefer polishing instead of glazing, to control the surface lustre. Rosentiel et al found that the fracture toughness of polished porce-

lain was greater than that of glazed porcelain and that both types of finish were equally resistant to staining by coffee.¹¹

Methods Of Polishing Porcelain

The choice of finishing and polishing technique to achieve the optimum smoothness of glazed porcelain has been the subject of a number of studies. Barghi et al found that the smoothness of the surface attained after glazing is not affected by surface treatment prior to glazing.⁸

Zalkind et al found that glazing a porcelain surface which is reduced by an abrasive instrument will not reduce the resulting roughness. They observed that the only way to produce a surface as smooth as it had been before, is to sandblast the abraded surface with aluminum oxide powder before refiring to produce a natural glaze.¹²

Sulik and Plekavich¹³ polished fully maturated porcelain by using a hard rubber wheel, wet pumice and wet tin oxide, sequentially. They found no differences clinically or by means of scanning electron microscopy, between the polished and naturally glazed surfaces of vacuum fired porcelain. Some voids were present on the polished surface which were not evident on the glazed surface.

Smith and Wilson used a series of Soflex discs, designed for finishing composite restorations, to achieve a surface finish on trimmed porcelain surfaces. They found that the surface finish attained with the Soflex discs was comparable to that produced by abrasives commonly used for trimming porcelain surfaces.¹⁴

Haywood et al used a series of finishing grit diamonds with diminishing particle sizes (Micron Finishing System), followed by a 30 fluted carbide bur and diamond polishing paste to polish porcelain intraorally. They found this method produced surfaces that were as smooth as glazed porcelain.¹⁵

Goldstein found that cups and points made by Shofu were the best instruments available for the final finishing of porcelain.¹⁶

Patterson et al examined the surface smoothness produced by a commercial porcelain refinishing kit, incorporating diamond paste (Chameleon Diamond Paste), by using scanning electron microscopy and profilometry.¹⁷ They found the paste was capable of achieving a good porcelain surface smoothness on surfaces previously adjusted by fine (red band FG) diamond burs. However, this polishing system was incapable of achieving a surface smoothness comparable to that produced by glazing.

Raimondo et al compared the surface finish of unglazed porcelain produced by six different polishing techniques, with that produced by glazing.¹⁸ The Shofu kit was the only kit, among those tested, that did not come with polishing paste. It produced a surface that was least acceptable visually, however, its results rated better when examined under the scanning electron microscope. The researchers recommended this kit for smoothing porcelain, if used in conjunction with a porcelain polishing paste containing fine diamond particles.

Grieve et al¹⁹ evaluated three methods of polishing porcelain: a diamond paste; a pumice and water slurry, followed by whitening and a proprietary porcelain finishing kit. A rubber wheel impregnated with carborundum was first applied in all cases. The diamond paste produced the smoothest surface, with the proprietary porcelain finishing kit producing the least smooth surface. Both the diamond paste and the pumice/whitening procedure produced surface finishes comparable to the original glazed surface.

Coarser abrasives give rise to rougher porcelain surfaces. Klausner et al²⁰ showed that diamond produces the roughest surface and that porcelain finishing stone also produces considerable roughness. These researchers found the Shofu finishing kit was capable of producing as smooth a surface as glazed porcelain.

The efficiency of porcelain polishing was found to be improved when diamond instruments were

Table 1

Methods Of Polishing Adjusted Porcelain Advocated By Various Authors

Sulik and Plekavich 1981	Hard rubber wheel, wet pumice and wet tin oxide respectively.
Smith and Wilson 1981	A series of soflec discs designed for finishing of composite.
Klausner et al 1982	Diamond paste and the pumice/whiting.
Zalkind et al 1986	Sandblasting with aluminum oxide before refiring.
Haywood et al 1988, 1989	Instruments which progressively decrease in particle size (series of finishing grit diamonds) 30 fluted carbide bur and diamond polishing paste. Diamond burs used at moderate speed wet or carbide instruments at high speed dry.
Goldstein 1989	Cups and points made by Shofu
Haimondo et al 1990	Shofu kit followed by diamond paste.
Patterson et al 1991	Fine (red band FG) diamond burs followed by diamond paste.
Scurria and Powers 1994	Aluminous oxide paste followed the use of the aluminous oxide points.
Jagger and Harrison 1994	Series of sandpaper disks of increasing fineness (Soflex) and rubber points (Shofu).



Fig. 1: Kit for finishing adjusted porcelain.

used at moderate speed, with water spray, or when carbide instruments were used at high speed, without water spray.²¹

Scurria and Powers examined the surface roughness of two types of ceramic (Ceramco II and Dicor MGC) subjected to five different polishing systems.²² The polishing systems comprised various combinations of: diamonds (45, 25 and 10 µm); a 30-fluted carbide; three silicon carbide-impregnated rubber points; diamond paste (4 and 1 µm); an aluminum oxide point; and two aluminum oxide pastes.

The controls specimens were autoglated Ceramco II and Dicor MGC ceramic blocks milled with a Cerec diamond wheel.

They found that feldspathic porcelain could be polished smoother than glazed porcelain. Dicor polished to a smoother surface than Ceramco II ceramic, by using diamond paste. Finishing diamond points produced the smoothest surface. Smoothness was not improved by using a 30-fluted carbide. For Dicor ceramic, aluminum oxide paste following the use of aluminum oxide points

produced a result that was equivalent to that produced by finishing diamonds and gels.

Studies Of Enamel Wear

In their in-vitro investigation of enamel wear caused by unglazed, glazed and polished porcelain, Jagger and Harrison²³ found that the rate of enamel wear produced by glazed and unglazed Vitadur porcelain was similar. Porcelain polished with a series of sandpaper disks of increasing fineness (Soflex, 3M) and rubber points (Shofu) produced substantially less enamel wear. The investigators highlight the damage that porcelain can potentially inflict upon enamel, and suggest that porcelain should be polished instead of reglazed after chairside adjustment.

The same authors^{24,25} investigated the wear caused by selected restorative materials to opposing dentine and enamel. They found that glazed porcelain produced the greatest amount of wear in dentine, compared to the wear produced by amalgam, gold and microfine composite. The enamel wear produced by glazed and unglazed porcelain was equivalent but greater than the wear produced by the other restorative materials investigated. Hudson et al confirmed these find-

ings, with regard to enamel wear, in a recent study.²⁶

Hacker et al recently investigated the enamel wear caused by low-fusing porcelain (Procera All-Ceramic), feldspathic porcelain (Ceramco), and gold alloy (Olympia, J.F. Jelenko).²⁷ To simulate the oral environment, the testing was performed in a well of fresh, natural, human saliva. Significant differences in restorative material wear were found between the gold and the porcelain materials. The feldspathic Ceramco porcelain caused the greatest wear of enamel.

Conclusion

Table I summarizes the various polishing techniques recommended by different authors. The results of the studies described in **Table I** support the use of polishing as an alternative of glazing.

A number of studies suggest that the Shofu polishing system produces a surface finish comparable to that of glazed porcelain,^{7,20} while others have highlighted the importance of using a diamond paste along with the Shofu system, in order to achieve the best possible finish.^{9,16} This system contains hybrid diamond points for adjustments, Dura-white stones for recontouring and Ceramiste points for smoothing.

We recommend that any adjusted porcelain restoration should be reglazed or subjected to a finishing sequence which is followed through to a final stage of polishing with diamond paste. For polishing, we prefer the Shofu porcelain veneer kit.

Finishing is done in four stages:

- hybrid points with fine grade 15 micron diamond grit;
- Dura-white stones;
- Ceramiste silicone rubber points;
- Ceramiste silicon rubber cups used in conjunction with a fine grade 2 µm diamond polishing paste (Westone Diglaze) see **Fig. 1**.

Care should be taken clinically to avoid over-reduction of an aluminous porcelain surface. Over-reduction will lead to exposure of

a less homogeneous layer of alumina, that will give rise to a more abrasive surface in the finished restoration. ■

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The authors have no declared financial interest in any company manufacturing the types of products mentioned in this article.

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CLINICAL PRACTICE



Soft Tissue Transfer Models: The Patient-Dentist- Laboratory Connection

Sebastian Saba, DDS, Cert. Prosth.

ABSTRACT

The dental technician must have an accurate impression of gingival contour, in order to apply porcelain correctly to a metal-ceramic restoration. This article describes a technique for making an accurate model of the soft tissues around a restoration. The technique involves taking a transfer impression and making a soft tissue model.

MeSH Key Words: dental models; dental impression techniques; laboratories, dental; communication.

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This article has been peer reviewed.

Introduction

The location of the gingival margin, the design of the metal substructure and porcelain contour, and the emergence profile¹ are critical variables in the design and esthetics of the prosthetic restoration. The location and emergence of the prosthetic margin are crucial to the gingival health and maintenance of oral hygiene.² The obstruction of embrasure spaces by metal or porcelain will compromise the long-term periodontal health of the attachment apparatus.

The design of the pontic region and porcelain contour may also contribute to hygiene complications. The location of the prosthetic margin, contour and emergence profile of the prosthetic design will also affect the esthetic objectives. Exposed metal margins and bulky prosthetic designs will compromise the esthetics and influence the adjacent soft tissue response.³ A portrait of porcelain and metal cannot be appreciated without a frame of gingival health.

Communicating With the Laboratory

Frequently, the laboratory must interpret the necessary space for the metal substructure from trimmed die models which have lost their original gingival contours. Often, the result is associated with incorrect emergence profiles and bulky designs in the metal substructure (Fig. 1). This is due to the lost of reference gingival architecture during die trimming and separation procedures. The framework can still be related to the gingival architecture with the use of soft tissue transfer models.⁴

These models have gingival masks which duplicate the gingival architecture of the involved abutments. They allow the lab technician to see the existing gingival architecture surrounding the involved abutments and make corrections in the metal substructure to allow for proper emergence profile and contour. They also provide the key to proper ceramic application. It is unreliable to apply porcelain over the edentulous ridge and

interproximal areas without a definitive soft tissue model that will reflect the gingival architecture that must be respected.

Recording Technique

Once the framework fit and passive nature of the seating of the metal substructure has been confirmed intraorally and the appropriate interocclusal registration has been taken, the relationship of the soft tissue to the framework must be recorded to guide the lab technician for any metal corrections and for porcelain application. The interproximal tissue location, ridge contour and emergence profile of the soft tissue must be respected and factored into the final porcelain contour.

The metal substructure is seated intraorally and a transfer impression using dual wash (light/medium body) technique using Permadyne light body impression material (ESPE America, Norristown, Pa.) injected around the seated framework and Impregum medium body impression material (ESPE America, Norristown, Pa.) within a stock tray



Fig. 1: Bulky metal substructure for anterior maxillary porcelain fused to metal bridge.



Fig. 4: Properly contoured porcelain of anterior maxillary bridgework on the soft tissue transfer model respecting the clinical gingival contour.



Fig. 2: Transfer impression incorporating porcelain fused to metal substructure.



Fig. 5: Properly contoured porcelain of anterior maxillary bridgework intraoral view, respecting the clinical gingival contour.



Fig. 3: Soft tissue transfer model with GC Pattern Resin abutment replicas.

(Fig. 2). The objective is to capture the gingival contour around the abutments and crest ridge.

After the impression has been made, the inside of each abutment retainer is slightly lubricated with a thin layer of Vaseline. GC Pattern Resin (GC America, Chicago, Ill.) is painted inside each retainer. GC Pattern Resin is used to register the location of the abutments within the soft tissue model. The dimensional stability of this resin upon setting, allows

for a very accurate representation of the position of the abutments.

The gingival mask is then made by mixing Coe-Soft reline material (GC America, Chicago, Ill.) into a disposable syringe and injecting it around the bridge and the model is poured with die stone (Fig. 3). The soft tissue transfer model is then mounted using the interocclusal registration and the final metal correction and porcelain application instituted (Figs. 4 and 5). ■

Acknowledgment: the author would like to thank Mr. Yvon Nadon, laboratory technician, Art dentaire moderne.

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The author has no declared financial interest in any company manufacturing the types of products mentioned in this article.

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The Enhanced Canadian Dentists' Investment Program: Serving You Better

Since its inception, the Canadian Dentists' Investment Program has continually grown to serve the complete investment needs of Canadian dentists. Created at the start of this year, with the existing CDA RSP and CDA RIF as its base, the Program responded to investors' desires for self-directed investment plans. Now it has once again expanded in scope to better serve your investment needs.

Recent enhancements to the Program include the introduction of a new investment plan for non-registered investments — the CDA Seg Fund Investment Account — as well as the addition of four new investment funds to the existing 14 CDA funds within the CDA RSP, CDA RIF and the new plan.

These new enhancements and others, combined with the existing elements of the Investment Program, provide everything investors need to accommodate their personal investment style (see **Table I**).

The New CDA Seg Fund Investment Account

The CDA Seg Fund Investment Account provides a complete platform for dental professionals who like the diverse range of CDA funds within the CDA RSP, but who want to invest outside of an RRSP, perhaps because their maximum annual contribution limits have already been reached. Non-registered investing also provides investors with an effective method to save for

a home or to establish a trust for their children and grandchildren.

The Investment Program's existing CDA Investment Account provides participants with a wide range of non-registered investment options (such as individual stocks and bonds) through Sun Life Securities Inc. In contrast, the new Seg Fund Investment Account allows participants to invest in most of the investment funds available in the CDA RSP and to gain the many advantages those funds offer — such as low fees and professional investment management. Investing in the CDA funds is particularly attractive to those who don't want to manage a portfolio of individual securities.

The new plan offers funds that invest in domestic, American and foreign equities, in addition to bonds, money market investments, index investments and GICs. With the CDA Seg Fund Investment Account, only low management fees are built into the funds' unit values. There are no loads, commissions, transaction charges, sales or service fees. Additionally, since the CDA funds are segregated, they offer greater security than mutual funds — for example, money within the funds may be protected from creditors if certain conditions are met.

New Funds Add To Investors' Choices

With the recent addition of the four new CDA funds within the CDA RSP, CDA RIF and the CDA Seg Fund Investment Account (see **Table II** for the complete list of funds), investors will have the means to further diversify their portfolio. At the same time, they'll have the added potential of receiving greater returns by taking advantage of new investment opportunities, such as index investing.

The four new CDA funds are:

1. **The Fixed Income Fund** — a low-risk fund provided through McLean Budden, it invests in government and corporate bonds. Managers make investment choices based on a six- to 12-month forecast for interest rates and economic activity.
2. **The TSE 35 Index Fund** — considered medium-risk, this fund is offered through Sun Life of Canada and aims to match the performance of the Toronto 35 Index. This index consists of 35 of the largest and most widely-traded stocks on the TSE, encompassing a broad cross-section of industries. The fund invests in Toronto 35 Index Participation Units or direct equity holdings.
3. **The S&P 500 Index Fund** — also considered a medium-risk fund, it aims to match the performance of Standard and

Table I
Canadian Dentists' Investments Program Options

Plan Type	CDA Fund Plans	Sun Life Securities Plans
RRSP	CDA RSP	CDA Self-Directed RSP
RRIF	CDA RIF	CDA Self-Directed RIF
Investment Account (Non-registered)	CDA Seg Fund Investment Account - New	CDA Investment Account

Poor's 500 Index (which includes 500 companies covering more than 70 per cent of the U.S. equity market by capitalization). The fund invests in Standard and Poor's Depository receipts, which are securities that hold stocks in the index in amounts proportional to their weights in the index.

4. **The Global Stock Fund** — conservatively-managed and considered medium-risk, this fund is offered through Templeton Management. It aims to achieve long-term capital growth by investing in equity securities listed on the stock exchanges of any nation other than Canada. It looks for stocks which possess earnings and/or assets that are expected to increase in value over the next five years.

In particular, the two index funds mentioned above, present investors with a new type of investment opportunity.

An index equity fund invests in all, or a representative sample of investments, of a stock exchange's "index." An index uses a broad range of securities specified by an exchange to provide an indication of how a market is doing. It then reinvests any dividends earned in those shares. As a result, the performance of an index fund (while subject to investment expenses and a limited tracking error) closely follows the performance of the index itself. Since index funds are used as a benchmark for other funds, they will never significantly underperform the market. As a result, they are highly attractive for investors. A low management fee of 0.67 per cent is yet another appealing feature.

Automated Access To Accounts Introduced

Another new development which has already been well-received by investors is a convenient automated service. Since July, participants in the CDA RSP and the CDA Seg Fund Investment Account have enjoyed the option of gaining instant access to their accounts 24-hours a day via a touch-tone telephone or the Internet. With this new service, offered through Sun Life, it's never been easier to re-balance your account to meet your changing needs.

A press of a button allows investors to access a variety of account-related information, including fund balances, summaries of yearly contributions and current market values of CDA investment funds, and to make fund transfers. For security and confidentiality, both systems require investors to submit account and PIN numbers. (Contact CDSPI if you haven't already received a PIN number.)

The phone system, called SunLine, can be accessed at no cost by dialling 1-800-668-8229, or by calling CDSPI and selecting the SunLine prompt. Those on-line, can be linked to SunNet by pointing their browser to www.cdspi.com. Once there, simply click on the *Check Your CDA Investments* icon.

Hot Off the Presses

In other developments, CDSPI has recently produced two new publications to aid those making investment choices. The first, *Ten Easy Steps to Reaching Your Investment Goals*, is specifically designed for those new (or relatively new) to the world of investing. A step-by-step introductory guide to investment basics, the 25-page booklet offers general information on how to create a portfolio

of your own, based on such factors as your financial goals and risk tolerance.

More mature investors will be interested in the newly-available 14-page booklet, *Life After RRSPs*. Designed to provide investors with general retirement planning information, it has been tailored to help you understand your retirement income choices, while explaining the particular advantages and disadvantages of each choice.

To obtain either of these informative guides, simply contact CDSPI toll-free at 1-800-561-9401, extensions 253, 255, 256 or 291.

The new features of the Investment Program, combined with its other components (the CDA RSP, the CDA Investment Account, the CDA Self-Directed RSP, the CDA RIF and the CDA Self-Directed RIF) can facilitate all of your investment goals under one umbrella at any stage of your life.

For all your financial planning needs, whether you're seeking general direction, detailed information, an objective perspective or a sec-

Table II:
CDA Funds

GIC Fund (Sun Life)
Money Market Fund (Canagex)
Bond and Mortgage Fund (Canagex)
Fixed Income Fund (McLean Budden) - New
Balanced Fund (KBSh)*
TSE 35 Index Fund (Sun Life) - New
Canadian Equity Fund (Trimark)
Common Stock Fund (Altamira)
Special Equity Fund (KBSh)*
International Equity Fund (KBSh)*
Global Fund (Trimark)
Global Stock Fund (Templeton) - New
S & P 500 Index Fund (Sun Life) - New
US Equity Fund (KBSh)*
European Fund (KBSh)*
Pacific Basin Fund (KBSh)*
Aggressive Equity Fund (Altamira)
Emerging Markets Fund (KBSh)*

* Knight, Bain, Seath & Holbrook

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CDA RSP — THE PERFORMANCE RRSP

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CDA Fund Performance[†] (for period ending July 31, 1998)

CDA GROWTH FUNDS	1 year	3 years	5 years	10 years
Canadian				
Aggressive Equity Fund (Altamira)	-5.1%	12.6%	n/a	n/a
Common Stock Fund (Altamira)	-0.1%	7.7%	8.1%	8.6%
Canadian Equity Fund (Trimark) ^{††}	-6.0%	10.1%	11.5%	11.2%
Special Equity Fund (KBSH)*	1.7%	29.6%	25.6%	n/a
International**				
Emerging Markets Fund (KBSH)	-30.8%	-11.3%	n/a	n/a
European Fund (KBSH)	45.2%	24.6%	n/a	n/a
International Equity Fund (KBSH)	8.8%	11.7%	n/a	n/a
Pacific Basin Fund (KBSH)	-21.1%	1.1%	n/a	n/a
US Equity Fund (KBSH)*	11.1%	20.5%	19.2%	17.0%
Global Fund (Trimark) ^{††}	5.1%	13.7%	17.9%	16.4%
CDA INCOME FUND				
Bond & Mortgage Fund (Canagex)	5.8%	9.6%	8.0%	10.1%
CDA CASH AND EQUIVALENT FUND				
Money Market Fund (Canagex)	3.7%	4.2%	4.7%	7.1%
CDA GROWTH AND INCOME FUND				
Balanced Fund (KBSH)	3.5%	13.1%	11.0%	10.3%

[†] CDA figures indicate annual compound rate of return with all fees deducted. The figures are historical rates based on past performance and are not necessarily indicative of future performance.

^{††} The rates of return shown for the Canadian Equity Fund (Trimark) and the Global Fund (Trimark) are based on the returns of the Trimark Canadian Fund and the Trimark Fund respectively, the mutual funds in which those CDA funds invest. Returns are historical and are after deduction of management fees. As a result, the performance results differ from those published by Trimark Investment Management Inc.

* Historical figures shown are those for Knight, Bain, Seath & Holbrook's Special Equity Fund and US Equity Fund in which the CDA funds invest, after removal of management fees.

** These funds are subject to foreign content limitation.

For current unit values and GIC rates call CDSPI Toll-Free at 1-800-561-9401, ext. 350 or visit the CDSPI website at www.cdspi.com.

ond opinion, CDSPI's professional advisor John Webster (phone: 1-800-561-9401, extension 291) is available to address your concerns.

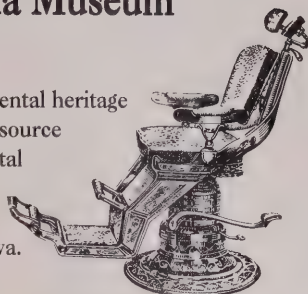
What does the future hold for the Canadian Dentists' Investment Program? Plans for further enhancements are already in the works. Presently, efforts are being made to provide eligible participants in Quebec and the Territories with complete access to the self-directed components of the Program. As well, the addition of new funds and fund managers is being examined and considered to further broaden your investment horizons. Also being considered, is the addition of a Registered Education Savings Plan (RESP) to the Investment Program.

For information on how the enhanced Investment Program can help you achieve your financial goals, contact CDSPI at 1-800-561-9401, extensions 253, 255, 256 or 291. We would also be pleased to hear any ideas on how CDSPI can better serve your investment needs. ■

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Memorabilia from our rich dental heritage are now on display in the Resource Centre at the Canadian Dental Association headquarters and the Dentistry Canada Museum in downtown Ottawa.



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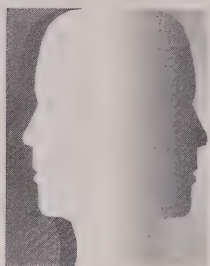
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September
1998
Vol. 64
No. 8

DEBATE



Amalgamation Of Medicine and Dentistry: The Solution To Our Problems?

Martin Deslauriers, DMD

For the past few years, the profession we all chose to practise with dignity has taken an undesirable, yet predictable, turn. Young graduates are having more and more difficulty working in their profession — an entitlement they earned through many years of hard work — because of a surplus of dentists.

This situation compounds problems we face in the university education system, with access to our services and with public information about our services. I recently read in the members' newsletter of the Quebec Dental Surgeons Association that the number of admissions to dental faculties would soon be reduced — and not a minute too soon!

Many medical specialties deal with different parts of the human body. The ophthalmologist takes care of our eyes, the cardiologist cares for our heart, and the otorhinolaryngologist (ENT) cares for our ears, nose and throat. As for the specialist caring for the mouth, teeth and surrounding tissues, half the population is unaware of who that is and many do not know that dentists can prescribe drugs and diagnose many systemic diseases.

A patient suffering from a toothache asked me one day whether he should consult a doctor to get a prescription. Others, are surprised to learn that we

make dental prostheses. Often I have heard, "My prostheses were made by Dr. X, a dentist."

However, the consumer is not to blame when faced with the contradiction of a health system that provides universal access to general health services, but limits dental coverage to children aged 10 and under. This is the situation in Quebec. How is it justified that the Quebec Health Insurance Board pays the cost of a consultation to treat a harmless plantar wart, but does not pay for a visit to deal with a dental problem unless it takes place in a physician's office? What is the justification for promoting certain specialties, when the statistics show that 57 per cent of young people will stop visiting the dentist after they reach the age of 10?

Likewise, why should the human body be compartmentalized in this way? Why do we need a faculty of dentistry which trains professionals who treat oral diseases with local or systemic causes, and a faculty of medicine which trains professionals who treat local or systemic diseases with many causes? While dentists have reasonable theoretical knowledge of general medicine, along with in-depth knowledge of oral and dental medicine, physicians have in-depth general practitioner's training, but limited training in anything to do with the oral cavity.

Many a patient turns up at a medical clinic for dental, oral and maxillofacial problems and is sent home with a prescription for antibiotics and a recommendation to consult a dentist. So why train semi-general practitioners? Why, during an additional year in university (which is being discussed at present in Quebec), would future dentists not be required to further their knowledge of medicine by doing duty in internal medicine, for instance?

And why wouldn't medical students do some training in dentistry? People think the basics are covered in ENT, but experience has shown hospitals don't know what to do for a toothache.

The disadvantages? Some professors might lose their seniority in the institution they are associated with and this would cause the universities to lose their leadership position in the profession. But this is how we, as practitioners, could assume responsibility for the destiny of dentistry.

In Quebec, as in other provinces, the College of Physicians is a very influential body. Combining forces with them would ensure we were heard and our rights were upheld. The salutary, some might say saving, solution would be to amalgamate the faculty of medicine with the faculty of dentistry. Students admitted

to medicine who want to become dental surgeons, for example, could then specialize.

In some cases, graduates might become overspecialized, but generally speaking they would be better prepared to perform dental surgery, operate on a non-medicalized patient, prescribe blood work, explain drug interactions and handle certain drugs in an emergency. This model has been adopted in France.

It's a logical development. Both physician and dentist treat human beings, are able to diagnose, operate and prepare prescriptions. Why couldn't they graduate from the same faculty? We can speculate on the outcome of this move: a drop in the number of specialists, the disappearance of quotas, practitioners familiar with emergency care, full waiting rooms — the likes of which haven't been seen in years!

It's interesting to note that at the University of Alberta, which has studied the issue of surplus dentists, medicine and dentistry will be combined for the first two years of their training, beginning this year. At McGill University, the medical and dental students are together for the first year-and-a-half of their programs.

Are we not entitled to the same aspirations as graduates of 20 years ago? My solution to the problems of young practitioners is only one among many, but when a profession is being offered many such suggestions by its own members, it has to realize that members are exhausted and at a loss. Let's not leave the next generation a profession that couldn't pull itself together in time.

Let's get people talking about us so the government will take action. If this reminds you of David and Goliath, just remember who had the last word in that story. ■

Dr. Deslauriers is in private practice in Iberville, Que.

The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the Canadian Dental Association.



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September
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No. 8

Halifax, Nova Scotia
August 5 - 7, 1999

Halifax '99



Seafood dining • Historic seaside attractions • Shopping, beaches, deep-sea fishing, golf & more

Since its founding in 1749, Halifax has been enjoyed as a bustling and peaceful haven for international travellers and merchants. Almost 250 years later, the capital city of the Province of Nova Scotia is still a major trading centre with plenty of comforts and lots of surprises.

The Weather

People expect Nova Scotia to have clean air. Halifax delivers. Officially, we've got the cleanest air of any city in the whole country! Because we're on the coast, the weather is moderate all year round — never too hot, never too cold. On summer afternoons, it can hit 25 degrees Celsius under a clear blue sky.

The Sights

There will never be time to see it all, but here are a few things you shouldn't miss when you come: a visit to the Halifax Citadel — Canada's most visited historic site, a stroll along Historic Properties — our restored 19th century waterfront shopping area, a side trip to Peggy's Cove — jewel of the Nova Scotia coastline, shopping along Spring Garden Road, and an evening at Neptune Theatre — one of Canada's oldest theatrical institutions.

Dining & Entertainment

Lobster, lobster, lobster. We've got more ways of serving it than saying it but, if you've got one shot at it, have it whole, fresh and with friends. We also serve mussels, salmon, clams, cod, halibut, crab, swordfish and fifty other kinds of fresh fish caught daily right off the coast. Later, if you like folk music, steamy jazz, wailing blues or stand-up comedy, there's a late night hotspot awaiting your arrival.

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INTERNATIONAL



October 1-3

3rd International Congress On Dental Law and Ethics in London, England. Contact Congress Office, British Dental Association, 64 Wimpole Street, London W1M 8AL, U.K. Tel.: 44 (0) 171 935-0875; fax: 44 (0) 171 486-0855.

October 8-12

86th Fédération Dentaire Internationale Annual World Dental Congress in Barcelona, Spain. Contact the Canadian Dental Association. Tel.: (613) 523-1770; 1-800-267-6354; fax: (613) 523-7736.

October 15-17

Microscope & Future — Multidisciplinary Symposium On the Use Of Microscopic Dentistry in Rome, Italy. Contact Mrs. Paola Mercaldo, G&G Congressi, 00143 ROMA, Via Tommaso Arcidiacono, 87, Italy. Tel.: 39 (06) 5043441 - 5043442; fax: 39 (06) 5033071.

October 30-31

International Symposium On Temporomandibular Joint Disorders and Chronic Orofacial Pain in Mangalore, Karnataka, India. Contact the Symposium Secretariat, College of Dental Surgery, KMC, Mangalore - 575 001, India. Tel.: +91 824-423803, ext. 304; or fax: +91 824-428183.

November 8-13

6th Annual Clinical Bermuda Symposium. Contact the University of Western Ontario, Continuing Education, Faculty of Medicine & Dentistry, Room H121 Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074, 1-888-281-1428; fax: (519) 661-3797; or e-mail: gerry.niles@med.uwo.ca

January 16-23, 1999

42nd International Alpine Dental Conference in Courchevel, France. Contact Marie-Ange Vitry, International Dental Foundation, 53 Sloane St., London SW1X 9SW, U.K. Tel.: 44 (0) 171 235-0788; or fax: 44 (0) 171 235-0767.

March 20-27

43rd International Alpine Dental Conference in Courchevel, France. Contact Marie-Ange Vitry, International Dental Foundation, 53 Sloane St., London SW1X 9SW, U.K. Tel.: 44 (0) 171 235-0788; or fax: 44 (0) 171 235-0767.

CANADA



October 1-3

International Conference on Geriatric Dentistry in Montreal, Que. Contact Olga Chodan. Tel.: (514) 398-7221; or fax: (514) 398-8900.

October 2

Scheduling For Productivity, Profitability and Stress Control, in Toronto, Ont. Presenter: Cathy Jameson. Contact the Academy of General Dentistry (Ontario Division), 204-40 St. Clair Ave. W., Toronto, ON M4V 1M2. Dr. Vlad Zogalal, tel.: (416) 536-6233; or Mrs. Wendy Maginn, tel.: (416) 323-0101.

October 2-3

Southern Ontario Surgical Orthodontic Study Group in Windsor, Ont. Contact Dr. Jeff Berger. Tel.:

(519) 258-2632; fax: (519) 258-2637; e-mail: jberger@mnsi.net

October 2-3

What's New in Oral Health in Halifax, Nova Scotia. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, NS B3H 3J5. Tel.: (902) 494-1674; or fax: (902) 494-2527.

October 17

Prosthodontic Series #1 - Porcelain Fused to Metal Prosthesis — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; or fax: (519) 661-3797.

October 23

Practical Crown and Bridge For Predictable Esthetics in Montreal, Que. Presenter: Dr. G.J. Chiche. Contact Ms. Olga Chodan, McGill University, Continuing Dental Education Department. Tel.: (514) 398-7221; or e-mail: CHODAN@MEDCOR.MCGILL.CA

October 23-24

Thompson Okanagan Dental Meeting in Kelowna, BC. Contact Alison Hall, Registration Coordinator. Tel./fax: (250) 832-2811; e-mail: alison@sunwave.net

October 30-31

Clinical Perio Series - Course #210 - Periodontal Surgery Workshop — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; or fax: (519) 661-3797.

November 13

Building a High Profit Practice and Motivated Team — Total Quality Management in Montreal, Que. Presenter: Dr. R.P. Levin. Contact Ms.

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Olga Chodan, McGill University, Continuing Dental Education Department. Tel.: (514) 398-7221; or e-mail: CHODAN@MEDCOR.MCGILL.CA

November 21

Clinical Perio Series - #220 - Clinical Periodontics for Dental Teams — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; or fax: (519) 661-3797.

November 25

Toronto Academy of Dentistry — 61st Annual Winter Clinic in Toronto, Ont. Contact the Toronto Academy of Dentistry, 170 Bloor St., W., Suite 902, Toronto, ON M5S 1T9. Tel.: (416) 957-5649; or fax: (416) 967-5081.

December 4-5

Annual Meeting of the Association of Prosthodontists of Canada in association with **The Greater New York Academy of Prosthodontics** in New York, NY. Contact Ms. Jennifer Rogers. Tel.: (905) 305-9373; or fax: (905) 886-8913.

December 5

Prosthodontics Series #2 - Bonded Prostheses — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; or fax: (519) 661-3797.

U.S.A.



February 3-6, 1999

6th Annual Conference and Exhibition Of the Academy Of Laser Dentistry in Palm Springs, Calif. Contact the Academy Of Laser Dentistry, 10435 Vernon Ave., Huntington Woods, MI 48070-1526. Tel.: (248) 548-7171; fax:

(248) 548-7174; or e-mail: acohen@laserdentistry.org

February 5-13

Pennsylvania Academy of General Dentistry's 9th Annual Caribbean Winter Seminar in St. Martin/St. Maarten. Contact Dr. Tom Howley. Tel.: (215) 699-8751; fax: (215) 699-5618; or e-mail: TAHOWLEY@aol.com

February 11-13

Miami Winter Meeting and Dental Expo in Miami, Fla. Contact the East Coast District Dental Society, 420 S. Dixie Hwy, Suite 2E, Coral Gables, FL 33146-2271. Tel.: 1-800-344-5660; (305) 667-3647; or e-mail: ecdds@ecdental.org

February 26-28

Barbados Dental Association's 11th Annual Mid-Winter Convention, in Barbados, W.I. Contact Mrs. Fay Mack, Barbados Dental Association, 17 Pine Rd., Belleville, St. Michael, Barbados, W.I. Tel.: (246) 228-6488; or fax: (246) 228-6488. In Canada, contact Lynne Brandon, tel.: (519) 657-4306 (evenings); or fax: (519) 472-9120; or Mr. Jerry Sheppard tel.: (519) 434-1647 (days); or fax: (519) 434-4936.

DENTAL MEETINGS



January 28-30, 1999

Manitoba Dental Association Annual Meeting in Winnipeg, Man. Contact Mr. Ross McIntyre, Tel.: (204) 988-5300; or fax: (204) 588-5310.

February 18-20

Pacific Dental Conference At Vancouver in Vancouver, B.C. Contact Ms. Marilynne Webster. Tel.: (604) 714-5303; fax: (604) 736-3645; or Web site: www.pdconf.com

March 26-27

CDA Board Of Governors Interim Meeting in Ottawa, Ont. Contact Ms. Suzanne Burton. Tel.: (613) 523-1770, ext. 2201; or 1-800-267-6354.

April 29 - May 1

Ontario Dental Association 132nd Annual Spring Meeting in Toronto, Ont. Contact Ms. Diana Thorneycroft. Tel.: (416) 922-4162, ext. 346; fax: (416) 922-9005; or e-mail: pdasm@oda.on.ca

May 25-30

93rd Annual General Meeting of the Alberta Dental Association in Jasper, Alta. Contact Dr. E.W. McIntyre. Tel.: (403) 484-1336; or fax: (403) 489-4930.

May 27-29

Prince Edward Island Dental Association Annual Meeting in Woodstock, P.E.I. Tel./Fax: (902) 892-4470.

May 29 - June 2

28e Congrès annuel de l'Ordre des dentistes du Québec in Montreal, Que. Contact Mme Nicole Pagé. Tel.: (514) 875-8511; or fax: (514) 393-9248.

June 4-5

New Brunswick Dental Society Annual Meeting in Saint John, N.B. Contact Mrs. Barb Wishart. Tel.: (506) 452-8575; or fax: (506) 452-1872.

June 19-20

Nova Scotia Dental Association Annual Meeting in Pictou, N.S. Contact Mr. Steve Jennex. Tel.: (902) 420-0088; or fax: (902) 423-6537.

Notices of meetings and continuing education courses are published without charge for appropriate **not-for-profit** dental organizations, teaching facilities or recognized study clubs. Information must be received two months prior to the expected publication date, and will be published at the discretion of the editor. Send all requests c/o Ms. Rachel Galipeau, *Journal* editorial assistant, Canadian Dental Association, 1815 Alta Vista Dr., Ottawa, ON K1G 3Y6.

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Offices & Practices

ALBERTA - Calgary: Experienced dentist wishes to purchase an established dental practice in Calgary. University of Alberta graduate, motivated, dedicated to patient care. All replies will be held strictly confidential. Please write: #234, 5149 Country Hills Blvd. NW, Suite 153, Calgary, AB T3A 5K8. D329

ALBERTA - Southwestern: Due to illness, must sell established rural general practice in the foothills of the Rocky Mountains. Beautiful new office built 5 years ago. Will stay on as associate to smooth transition. Excellent staff, hygienist, computer system, intraoral camera. Unbeatable lifestyle - skiing, watersports - yet 1 hour from the city. Phone (403) 627-4972, afternoons. D175

ALBERTA - Red Deer: \$280,000, modern, 10-operator cost share. Established 26 years. In superior location with 2,000 patients generating just under \$500,000. Vendor wishes to stay on to maximize retention in this unique and dynamic practice. Please reply in confidence to: Marie Aisthorpe, tel. (800) 661-1254 or e-mail craigais@agt.net D308

ALBERTA - Fort Saskatchewan: Just 15 minutes north of Edmonton. Wonderful opportunity in a rapidly growing and family oriented city. New office. Excellent location on main street with high visibility to traffic. Two operatories, two plumbed. New equipment and leaseholds including A-dec chairs/cabinets, Gendex pan/ceph, Kavo handpieces, intraoral camera, ceiling mounted TVs and much more. Owner returning to graduate school. Call (403) 460-2299, (403) 458-2533, evenings. D252

BRITISH COLUMBIA - Vancouver: Urban sophisticate wanted for downtown Vancouver, British Columbia waterfront dental office. We are a professionally managed, solo-group format of seven dentists in three separate practice locations in the Vancouver downtown core. This location is a two-dentist, three-chair dental office with all the hi-tech goodies, yet highly efficient and profitable. This is a very busy "state-of-

the-art" dental practice in a ground-floor, retail-style setting looking out at the water through 10 ft. glass windows - very relaxing. This is a purchase or short-term associate with a guaranteed buy-in at preset below-market price. 100% financing in place for the right dentist, but there is a catch. You must be committed to lifetime learning, excellence in clinical skills, patient oriented and be willing to either teach part time or be involved in study clubs. Female dentists are urged to consider this practice, as our flex schedule and above-average time off allow you to balance family and professional responsibilities. A second language (any language) would be an asset as would a great sense of humour and good endodontic skills. Please fax your CV with a covering letter stating your philosophy and goals to: Dr. Armstrong, Managing Doctor, Aarm Dental Group, (604) 683-5468. D331

BRITISH COLUMBIA - Okanagan: For sale, rural Okanagan practice in four-season holiday area. Only office in 15 km. radius, serving about 3,000 population. Reply to: CDA Classified Box #2754. D332

BRITISH COLUMBIA - Penticton: Busy family practice located in strip mall in Penticton, B.C. Existing dentist would like to stay on as partner or part-time associate. Fax (250) 493-1986 or tel. (250) 493-0020. D258

BRITISH COLUMBIA - Chilliwack: Office space rental, 1,076 sq. ft. Good for endodontist, 40 dentists in area and the nearest endodontist is 32 km away. The space has attractive, modern leasehold improvements and good natural daylight throughout. It is currently arranged to accommodate four dental chairs, has small private office, washroom, patient waiting area, two small lab areas as well as organized area for receptionist and patient files. The Chilliwack Medical Dental Centre is well maintained with night-time security system and security patrols. It has good street parking as well as building-owned parking. Owners will consider rental concessions to qualified renters. Rental rate \$11 per sq. ft. which includes common area expenses. Contact: Don Clark, tel. (604) 824-7339. D312

BRITISH COLUMBIA - Metropolitan

Vancouver: Excellent opportunity for one or two dentists to buy into a thriving and highly successful practice. If you are a team player and love the positive outcome of team approach to the running of a practice, then you owe it to yourself to check us out. Located in beautiful British Columbia, in the business and rapidly growing high density residential area of Burnaby, our practice is fully equipped and computerized. High billings annually on a 4-day work week for the past 25 years. Great potential for growth. For more information, please contact: Chris, tel. (604) 307-9082 or fax (604) 263-2504. D321

BRITISH COLUMBIA - Lower Mainland:

Exceptional opportunity to become the owner of an established practice in a growing community in the beautiful Fraser Valley. Vendor willing to stay as needed to ensure a smooth transition. Please reply to: Manfred Purtzki, tel. (250) 754-1951, fax (250) 754-1577. B.C. only, toll free, tel. (888) 668-0629 or toll free fax (800) 665-7211. D244

BRITISH COLUMBIA - Victoria Area:

Practice opportunity wanted. Mature dentist desires purchase or partnership in Victoria, B.C., or surrounding communities. All offers will be given serious consideration. Please reply in confidence to: CDA Classified Box # 2720. D045

NEW BRUNSWICK - Saint John:

Mature dental practice in midtown Saint John. Two fully equipped operatories, pleasant surroundings, clean building. This is an ideal opportunity for someone who is interested in entering into a practice in the Saint John area. Reason for selling is retirement. For more information, please contact: Bill Tingley, tel. (800) 565-1525 in the Maritimes or tel. (902) 835-1103 locally and outside Nova Scotia and New Brunswick. D286

LABRADOR - NEWFOUNDLAND: Well-established practice for sale. Three new operatories (one hygiene). Excellent staff, full-time hygienist. Computerized, panoramic X-ray. Two specialists rotate through clinic - periodontist, oral surgeon. Call Dave Harris at (902) 421-1533. D293

NEWFOUNDLAND - Corner Brook:

Solo family practice for sale with three operatories (one hygiene). Two thousand, five hundred plus patient base, computerized with efficient recall system. Periodontist rotates through clinic. Serious enquiries only. Tel. (709) 639-8451 (bus.), (709) 634-5321 (res.). D287

ONTARIO - Gloucester:

A great opportunity! Dental office with three fully roughed in operatory spaces available now in small professional building. \$1,000 in mill work there for you to use for free. Shared reception room cuts costs. Upper middle class community in Gloucester just 12 minutes from downtown Ottawa. Contact: Mrs. Sati, tel. (613) 746-7415. D337

ONTARIO - Ottawa Valley:

Offering associateship/ownership. Owner wishes to relocate to western Canada but willing to associate to smooth transition. Established main clinic plus satellite office with strong patient base (4,000 +). Both offices fully equipped, computerized. Main office - four operatories, satellite - three operatories. Excellent staff. Affordable purchase price, financing available to purchase one or both practices. Unbeatable rural lifestyle. Tel. (613) 584-1179. D283

QUEBEC - Mauricie:

Modern clinic, four fully equipped operatory rooms with X-ray units, computer and intraoral camera in each of them. Placed in a well-patronized medical polyclinic. Possibility of association or sale. Reply to: CDA Classified Box # 2750. D302

Positions Available/Sought

ALBERTA - Calgary: Associate dentist needed for northeast Calgary dental clinic. Please call (403) 276-3660 or fax (403) 276-3881. D338

ALBERTA - Rocky Mountain House: Part-time associate required in the growing central Alberta community of Rocky Mountain House. Expanding solo practice recently built with modern equipment. Applicant should be a highly self-motivated individual. Please call (403) 845-4476 or fax (403) 845-6090. D324

ALBERTA - Calgary: Dentist with 10 years experience seeking late fall associateship (full time/part time) in Calgary or area. Reply to: PO Box 75009, Cambrian Post Office, 728 Northmount Dr. NW, Calgary, AB T2K 1P0. D326

MANITOBA - Winnipeg: Associate position available to assume existing patients within a group practice. This is a golden opportunity to assume the practice of a departing dentist. This is a long-term position with a future partnership opportunity. Tel. (204) 663-4888, attention: Gwen or fax (204) 663-8214. D323

MANITOBA - Winnipeg: General practitioner wanted 4 days a week for a salaried position at the Dental Clinic, Canadian Forces Base, Winnipeg, Manitoba. Newly renovated and computerized facilities in a specialist group practice environment. Please call (204) 833-2500, ext. 5522 (days), (204) 488-0801 (evgs. and weekends) and fax (204) 833-2527 (anytime). Ask for Major Kevin Goheen. D333

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Call David Dobson, DDS, (705) 848-2244 (bus.) or (705) 848-2904 (res.) to arrange your visit. D289

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MANITOBA - Swan River: Associate wanted with view to purchase within 1 - 2 years. Well-established, busy general practice in west-central farming community. Five operatories, 4-day work week, long-standing friendly staff. Approximately 30 new patients monthly. Call (204) 734-4756 or (204) 734-2371, after 6 p.m. D288

MANITOBA - Oakbank: Part-time associate wanted for modern, rapidly growing practice. This attractive office is located 20 minutes from Winnipeg, in a rapidly growing family oriented town. Successful candidate must be highly motivated, caring, gentle and like working with children. A minimum of 2 years experience is required. Tel. (204) 989-2231, please leave message. D278

NORTHWEST TERRITORIES: Canadian-licensed dentists - we have associate opportunities in our Norman Wells and Inuvik clinics and rotational opportunities with mobile dental teams serving remote aboriginal-based settlements. These are excellent opportunities for motivated, practical-minded dentists with administrative skill and wide ranging operational skill. Please forward your resume and a covering letter to: Box 1360, Inuvik, NT X0E 0T0, or by fax to (867) 777-2774, attention Manager. D340

NORTHWEST TERRITORIES - Yellowknife: Canadian licensed dentists. Full-time associate position available in Yellowknife. Modern, computerized, centrally located clinic. Travel to outlying communities necessary. Exciting opportunity. Forward resume to: PO Box 2615, Yellowknife, NT X1A 2P9 or fax (867) 873-5032. D267

NORTHWEST TERRITORIES - Yellowknife: Canadian certified dental associate required for a modern family dental practice with pleasant support staff. The clinic is located in the city of Yellowknife. Seeking a caring motivated individual interested in a long-term position. Please reply to: CDA Classified Box # 2705. D012

NORTHWEST TERRITORIES - Kugluktuk: Canadian board-certified dentist required for part-time, full-time position. Emphasis on quality, gentle dentistry. Please apply to: PO Box 274, Kugluktuk, NT X0E 0E0, or fax resume to (867) 982-4512. D162

ONTARIO - Nepean: Busy west-end mall practice looking for an oral surgeon to work part-time. Enquiries, please call (613) 228-2833 or fax resume to (613) 228-9331. D327

ONTARIO - London: Cost-sharing or part-time associateship available in relaxed family oriented general practice. One fully equipped operatory available. Please send resume to: Dr. Ava Scott, 105 - 339 Wellington Rd. S, London, ON N6C 4P8 or call (519) 432-0777 for more information. D328

ONTARIO - Toronto: Periodontist wanted for thriving, progressive, congenial Toronto practice. Please call (416) 364-4150. D334

ONTARIO - Niagara-on-the-Lake: Solo practitioner with successful leading-edge facility in Niagara-on-the-Lake searching for full-time associate, possibly with view to an eventual buy in. Our attractive free-standing building, located on an acre of landscaped grounds, has state-of-the-art equipment and facilities inside. If you are confident, skilled and caring we would like to speak with you. Please call Anne, (905) 468-2128, Monday to Thursday. D336

ONTARIO - Guelph: We are looking for a highly motivated individual for a part-time associateship in our group practice. We anticipate this leading to full time/partnership. This position involves commitment to work evenings and weekends, and a dedication to clinical excellence and comprehensive patient

care. Please reply with resume to: Stone Road Dental Office, 435 Stone Rd. W., Ste. L3A, Guelph, ON N1G 2X6; tel. (519) 836-9330, fax (519) 836-1671. D309

ONTARIO - Niagara Region: Associateship wanted. Experienced general dentist available for full-, part-time or locum practice. Please call Geoff Smith, (905) 468-4985. D307

ONTARIO - Niagara Falls: Associate dentist to accompany me, a well-established, high-gross family dentist, in a modern and progressive dental office. This is an outstanding opportunity for the right individual. I welcome you to join me in this most pleasant setting. The office is conveniently located on a large, separate lot in a prime business area. It is spacious, with all modern updates and a warm and friendly long-time staff. I am anxious to meet anyone already established or newly graduated who is interested in this long-term fulfillment. Please contact me, Bruce Herod, DDS, 3936 Portage Rd., Niagara Falls, ON L2J 2K9; tel. (905) 356-7081. D305

ONTARIO - Ottawa: (1 hour west) Maternity leave replacement required for very busy practice. Four days/week for 6 months starting January 1999. Experience



**THE UNIVERSITY OF BRITISH COLUMBIA
FACULTY OF DENTISTRY
DEPARTMENT OF ORAL BIOLOGICAL AND
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Applications are invited for a full-time tenure-track position as an Assistant Professor in the Division of Periodontics and Dental Hygiene in the Department of Oral Biological and Medical Sciences. Responsibilities of the position include participation in and coordination of graduate and undergraduate teaching in periodontics including provision of an educational service component in the area of implant therapy. Candidates must have a diploma in periodontics and a research-based graduate degree and experience in teaching. Private practice privilege of 1 day per week is available.

Salary will be dependent upon qualifications and experience and is subject to final budgetary approval. The University of British Columbia hires on the basis of merit and is committed to employment equity. We encourage all qualified persons to apply. In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents of Canada.

Candidates are requested to forward a letter of application (including the names and addresses of three referees whom the selection committee may contact) and a curriculum vitae prior to November 1, 1998. Applications or further enquiries should be directed to:

Dr. Edwin Yen
Dean, Faculty of Dentistry
The University of British Columbia
345 - 2194 Health Sciences Mall
Vancouver, BC V6T 1Z3
Fax (604) 822-4532
E-mail edyen@unixg.ubc.ca

D339

preferred. Part-time associate position available after leave completed. Contact: David, tel. (613) 623-2054 (leave message), fax (613) 623-2058. D233

ONTARIO - Ottawa: Full-time associate needed, with future partnership potential. Days and evenings. High gross practice located in superb, self-standing, brand new facility on major street. Bilingualism an asset. Call (613) 748-8266, fax (613) 745-3305. D235

ONTARIO - Toronto: Cost-sharing opportunity. Looking for dentist with existing patient base who wishes to relocate in downtown Toronto practice. Excellent staff, strong hygiene program. Across from the Faculty of Dentistry. For further information, please contact: Karen, tel. (416) 597-0411. D279

ONTARIO - Cambridge: Endodontist - excellent opportunity! Full or part time in well-established, new facility, multispecialist office. Growing community of 102,000. General anesthesia available. No investment

required. Please contact: M. Viol, tel. (519) 623-3810 or fax (519) 623-1760. D240

QUEBEC - St. Regis: Full-time dental position available immediately. Dentist required to operate a five-chair clinic in a modern facility. Support services include hygienist, periodontist, endodontist, orthodontist and oral surgeon. We are looking for a conscientious, caring and motivated individual to provide general dental services with a strong emphasis on preventive care. The position is classified english essential. Expression of interest should be directed to: Hilda King, Director, Akwesasne Dental Services, tel. (613) 575-2341, ext. 200. D325

YUKON TERRITORY - Whitehorse: Quality living at it's best. Full-time associate wanted for busy five-operative practice. Fully computerized, pan/ceph and highest quality of care. Newly renovated with an excellent working atmosphere. Enjoy working in a friendly environment while experiencing the beauty of the great north. Please fax or

mail resume to: Pine Dental Clinic, 5110 - 5th Ave., Whitehorse, YT Y1A 1L4; fax (867) 668-5121. D330

YUKON TERRITORY - Whitehorse: Two associateships available in 3-year-old dental practice. Cost sharing partners are booking 3 months in advance and are seeing new patients daily. Individuals with a caring nature, high ethical standards and strong clinical and communication skills will enjoy tremendous success in serving this wonderful community. Please send resume with references, to: Dandelion Dental Clinic, Attn: Jane, 206 Lowe St., Suite D, Whitehorse, YK Y1A 1W6; tel. (867) 667-7227. D265

SULTANATE OF OMAN: Opportunities exist for an orthodontist and general dental practitioner in a prestigious private practice in the Sultanate of Oman. Attractive packages, including tax-free salaries. Replies to: Hamoud Al-Said, PO Box 431, Al- Harthy Complex, PC 118, Sultanate of Oman. D335

Letters

Continued from page 544 ...

wide variety of clinical situations. As a dentist, I am called on daily to make clinical decisions. I fear that some of the decisions I make, from time to time, may not be the best ones in particular circumstances.

For example, how should I treat a 16-year-old with a smallish Class 2 lesion? Should I use amalgam (bonded or not) or composite? How should I prepare the cavity (slot, tunnel or classical preparation)? What liner, if any, should I use?

It would be nice if we could look to the *Journal* as a trusted source of factual information on various materials, techniques and devices. It is hard to know who to trust these days.

Lee Hickling, DDS
Kincardine, Ont.

Editor's note

This letter captures very well the essence of the suggestions that

many practitioners have offered to me in the past year. You are telling me that you want material that is trustworthy, readable and pertinent to everyday practice. I want the *Journal* to satisfy these criteria.

This message came to me via the e-mail contact network I have been setting up over the past few months. By means of this network, I hope to gather suggestions and ideas to make the *Journal* more useful to Canadian dentists. I would like to have a representative from each local dental society in the country on my contact list. Your active input will ensure that the *Journal* meets your needs. ■

Letters may be edited for space and clarity, at the discretion of the editor.

"I'm too tired."

Chronic fatigue *can* be one of the warning signs of diabetes. If you feel constantly tired or lacking in energy, don't ignore it. Please see your doctor.

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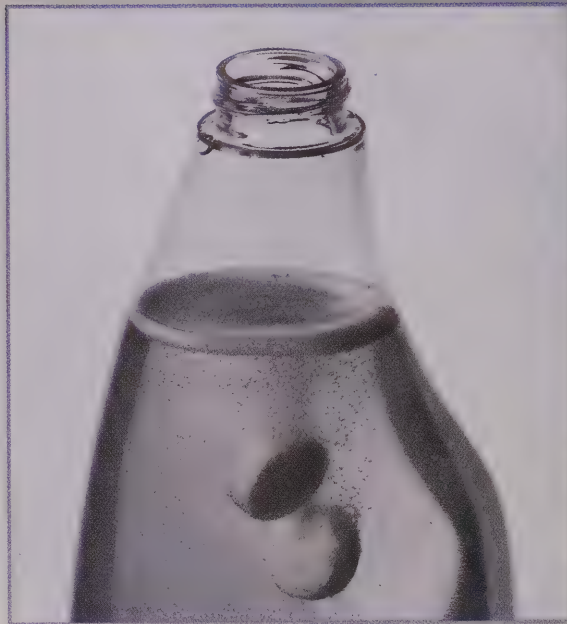
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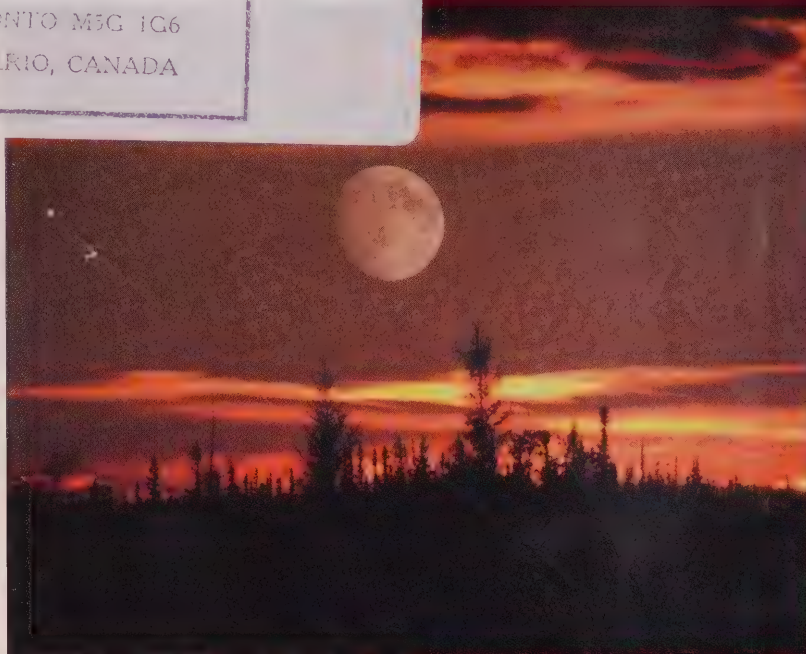
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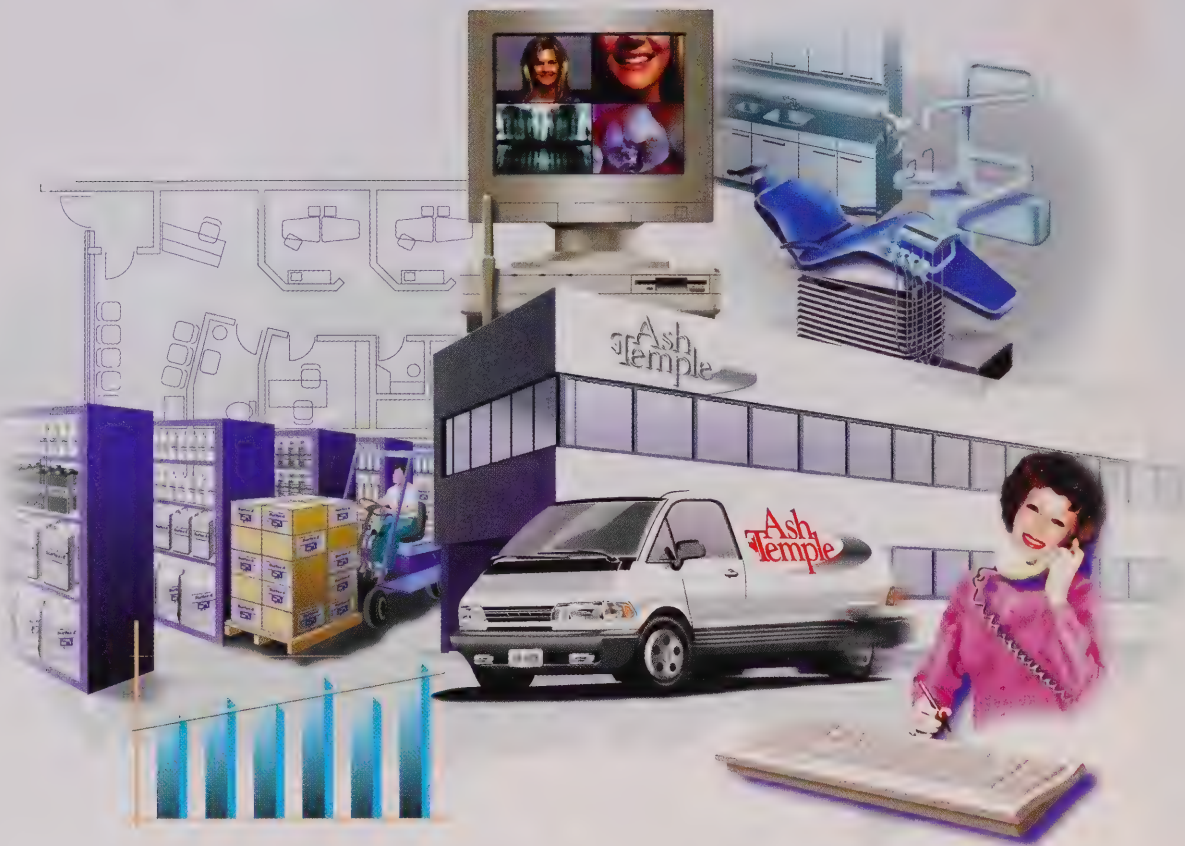


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Subscriptions are for 11 issues, conforming with the calendar year. All 1998 subscriptions are payable in advance in Canadian funds.
In Canada — \$50 (+ GST); United States — \$72; all other — \$80.
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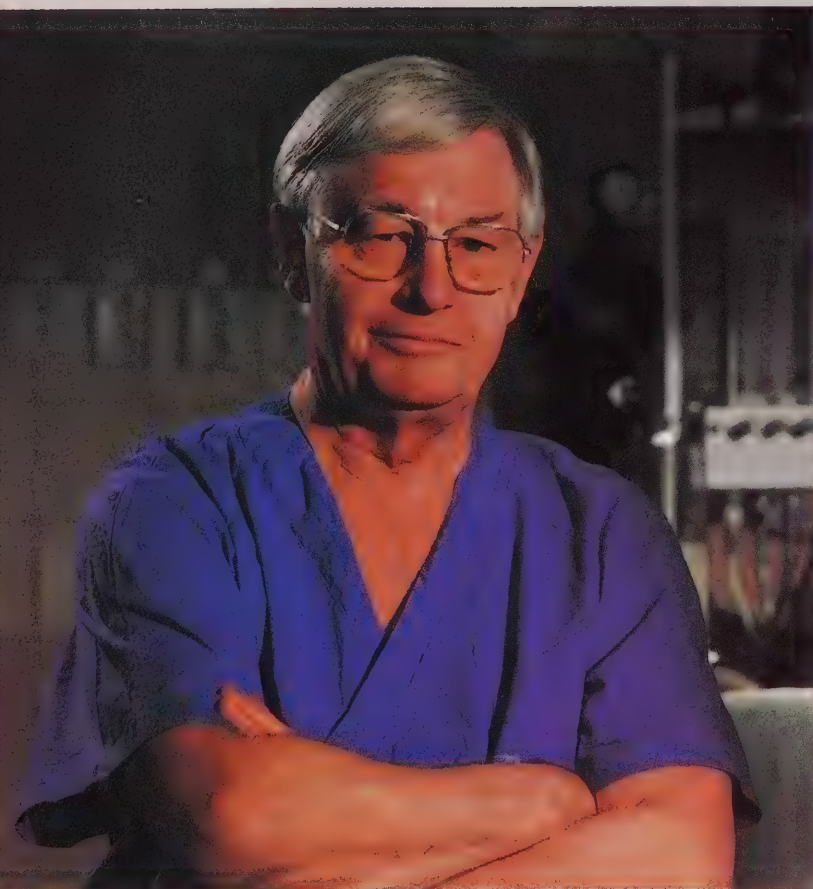
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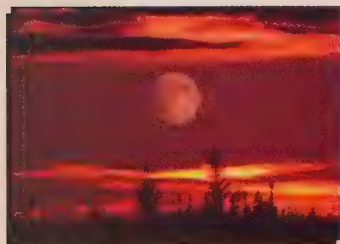
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The *Journal of the Canadian Dental Association* is published in both official languages — **except scientific articles which are published in the language in which they are received**. Readers may request the *Journal* in the language of their choice.

ISSN 0709 8936
PRINTED IN CANADA



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JADA, Vol. 126, (February, 1995), 244-245

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Reality, Vol. 9, (January, 1995)

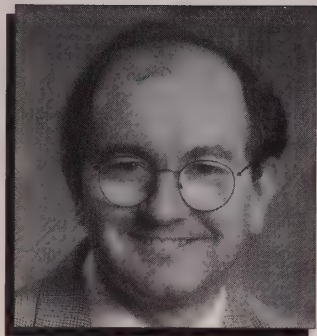
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EDITOR'S NOTES



Dr. John P. O'Keefe

Dr. Sandilands's Challenge

I find the question "Is CDA Irrelevant?" posed by Dr. Richard Sandilands in his column (see p. 609), very challenging and refreshing, by virtue of its directness. The question is out in the open and it can't be avoided. This question should generate good debate in the months ahead and I invite readers to submit letters to the editor and opinion pieces in response to Dr. Sandilands' question. I believe this type of debate is very healthy for CDA as we face the challenges ahead.

I regularly ask myself a modified version of his question, "How can I help make CDA's publications more relevant to readers?" My answer is based on the assumption that Canadian dentists need various types of good quality information to function well as professionals. For CDA's publications to be relevant, we must first identify the information needs of readers and second, do our best to provide the information we are uniquely positioned to provide in a timely manner.

Dentists are spoiled for choice when it comes to sources of clinical, business and professional information these days. Our challenge is to be so good at what we

do, that you look to us as your primary source of information about national level issues. You are the judges of how well we succeed in meeting this challenge.

Dr. Toby Gushue, a Friend Of the Journal

I have particularly fond memories of Dr. Toby Gushue's tenure as CDA president. He always took an interest in how I was settling into my new role as editor. Twice, in particular, Dr. Gushue's leadership left a great impression on me.

At a meeting last November, Dr. Gushue told me that he believed the *Journal* "should take the high road" and "aim for the highest standards possible." These few words, within a couple of months of taking on this job, provided me with very welcome encouragement.

On another occasion, Dr. Gushue, made it clear to some people, who questioned a decision I had made, that the editor had certain criteria for accepting manuscripts, and that he as president would not interfere with my decision, because I was following these clear criteria. Such support is very reassuring for a fledgling editor.

Creating a "Dental Writing Centre"

I received two particularly interesting e-mail messages from members in the past few weeks. Both spoke about the difficulty of putting thoughts down on paper. One writer described her frustration in writing a piece for the *Journal*; despite numerous drafts she felt the piece was still "disjointed." She went on to ask, "How can it be so difficult to write about something that I am so passionate about?" The second correspondent had an idea for a short clinical article, but mused that "it was so hard to get around to putting the idea down on paper."

Both were recognizing that writing well is very hard work. As busy practitioners, finding the time and energy to write, even short pieces for the *Journal*, is hard. I know this only too well, and I would like to do everything possible to encourage Canadian dentists to write material for the *Journal* and *Communiqué*, and enjoy the process. So what can I do to help?

If you have an idea for an article, an opinion piece or a letter, I invite you to contact me with an outline of the main points you want to convey, before you invest time and energy in writing the piece. This contact can be made by telephone, e-mail, fax or regular mail. It may be easiest to pick up the phone and leave me a voice mail message that outlines your idea. I promise I will return your call and can help you to develop your idea further.

I wager that many dentists who are retired, or semi-retired, would still relish an opportunity to contribute to their profession. Perhaps these dentists, well versed in one or both official languages, would be in a position to help busy practitioners get their thoughts together for a clinical article or an opinion piece. I invite readers, who would like to help other dentists to write articles, to contact me so that we can set up a "virtual dental writing centre" at the CDA.

From my contact with members of the profession in the past year, I know that there are many Canadian dentists with good ideas that deserve to be shared with colleagues. I believe my role is to facilitate that exchange of information. I look forward to hearing from you.

John P. O'Keefe
1-800-267-6354, ext. 2297
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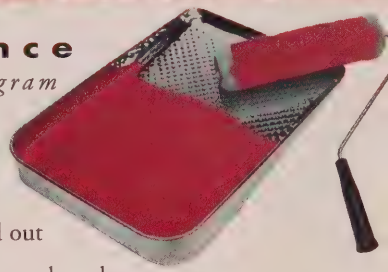
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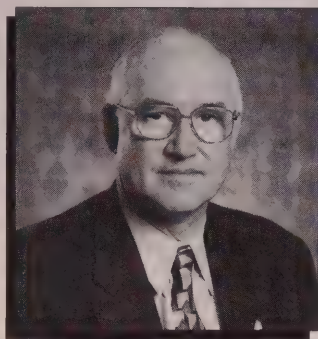


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PRESIDENT'S COLUMN

IS CDA IRRELEVANT?



Dr. Richard Sandilands

Is CDA irrelevant? As your president for the 1998-99 term, I will be exploring this particular question throughout my term of office. When I graduated from dentistry and set up my dental practice, I assumed that the national organization, the Canadian Dental Association, was a cornerstone of my new profession. I attended annual meetings, went to the national CDA conventions, and generally held those in the highest offices in organized dentistry in particular esteem. I made the assumption that my national organization would look after all of those functions that were outside the jurisdiction of my local and provincial dental organizations. I believed that if I became involved in the politics of dentistry, even at a local level, I might be able to change some of the directions I disagreed with at the time. When I entered the profession in 1965, I had absolutely no thoughts that in 1998 I would be writing this column as your president.

Throughout my political life however, I have become increasingly aware of the growing cynicism towards organizations and political bodies of all types, our own profession included. This growing concern leads me to pose

the following questions: are we on the brink of major changes in professional and public attitudes towards the provision and delivery of healthcare, in general, and oral healthcare, in particular? Is it timely to rethink the outcomes that are achieved? And, is it time to rethink the way we operate our national organization?

Welcome to 1998, and the reality in which CDA membership is a consuming issue throughout our profession and provincial organizations are in conflict over voluntary versus corporate/voluntary status. The slogan "what has CDA done for me lately" is whispered in the hallways as CDA presidents speak to the issues facing our profession. They deliver important messages that dentists need to hear about the national reality, to increasingly sparse audiences. As I assume the roles and responsibilities of the office of CDA president, I cannot help but be aware of the threats facing our profession as we approach the millennium. I am however, excited by the tremendous opportunities which have already presented themselves. One of my mentors in my professional career once stated, and I quote: "Whatever you would achieve, step up, pay the price, and you will succeed." I believed then and I believe now, that our future success as a profession will be determined by our willingness to step up and pay the price.

Questioning the relevance of CDA is similar to the situation throughout the country today. In the political realities of our everyday lives, we should ask the question, as we watch our federal government squander our tax dollars on questionable programs, and our provincial governments cut back on basic health services, education, and social services. Your management team, executive council, and the senior staff of CDA, will be attending this year's planning session in November. We will be actively working to answer this question to the satis-

faction of dentists in Canada and your input will be necessary in shaping your profession's future. It is time to renew CDA's vision and mission and your national executive council members are prepared to meet this challenge.

We are about to enter a new era of professional reality. The old guard of dental politics is being replaced across this country with new faces, attitudes, and expectation levels. Our corporate members are also revising expectation levels and seeking new solutions to the problems of the present and future. Organized dentistry will either meet the expectations of its membership or it will simply become redundant, suffering a loss of credibility, a loss of members and possibly its ultimate demise.

Without a strong national organization, how would the issue of the taxation of dental benefits have been addressed and would the outcome have been the same? Without a strong national organization, how would the issue of amalgam safety have been addressed and would the outcome have been the same? The same holds true for managed care programs, infection control, federal NIHB programs, accreditation programs, and issues that have yet to surface.

As your president, I can assure you that one of my primary goals is to continue to ensure that our national organization is strong, united, and relevant. The Canadian Dental Association has led — and will continue to lead — the profession as its national voice. We intend to ask for your commitment in addressing the problems facing dentistry across the country, and we will expect your honest, constructive, and critical opinions.

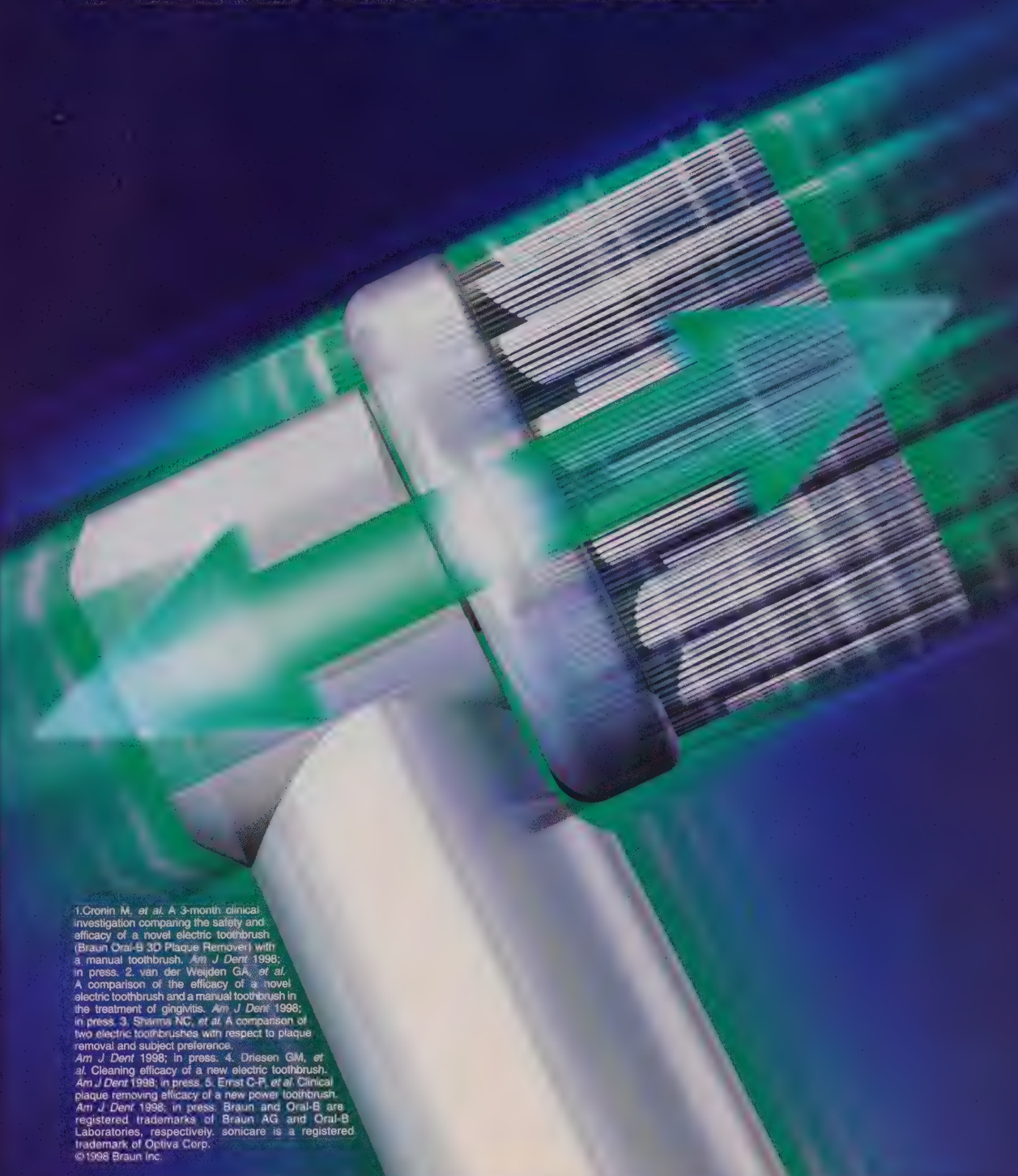
*Richard D. Sandilands, DDS
President of the Canadian Dental Association*

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Deep cleaning just entered a whole new dimension.



1. Cronin M, et al. A 3-month clinical investigation comparing the safety and efficacy of a novel electric toothbrush (Braun Oral-B 3D Plaque Remover) with a manual toothbrush. *Am J Dent* 1998; in press. 2. van der Weijden GA, et al. A comparison of the efficacy of a novel electric toothbrush and a manual toothbrush in the treatment of gingivitis. *Am J Dent* 1998; in press. 3. Sharma NC, et al. A comparison of two electric toothbrushes with respect to plaque removal and subject preference. *Am J Dent* 1998; in press. 4. Driesen GM, et al. Cleaning efficacy of a new electric toothbrush. *Am J Dent* 1998; in press. 5. Ernst CP, et al. Clinical plaque removing efficacy of a new power toothbrush. *Am J Dent* 1998; in press. Braun and Oral-B are registered trademarks of Braun AG and Oral-B Laboratories, respectively. sonicare is a registered trademark of Optiva Corp.
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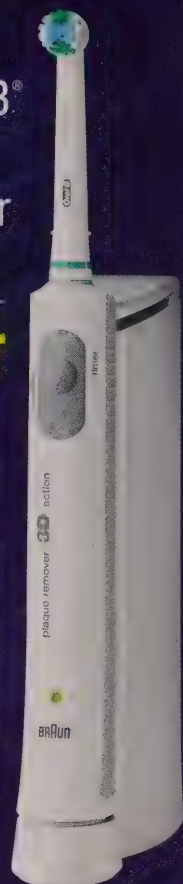
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Editor's Comment

The Journal welcomes letters from readers about topics that are relevant to the dental profession. The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the Canadian Dental Association. Letters should ideally be no longer than 300 words. If what you want to say can't fit into 300 words, please consider writing a piece for our "Debate" feature.

Hepatitis B Vaccination

A topic of great concern to me at present is mandatory testing for hepatitis B. As I understand the new regulations proposed by the Laboratory Centre for Disease Control (LCDC), dentists will be required to be vaccinated and show proof of seroconversion.

The bad news is that 5% of people will not seroconvert after vaccination. It would be a nightmare to have to post this information and then try to explain to patients that you are not resistant to the disease. It would likely destroy one's practice.

Hopefully, I am wrong. As I understand the regulations, my own career will likely be over, as I have had the shots three times and have not seroconverted. I also know several others in the same situation, and we all would like to get more information about this topic.

By the way, I like the *Journal* on the Web. Keep up the good work!

Harry Ames, DDS
Fredericton, N.B.

Dr. Benoit Soucy's Response

As a non-infected non-responder, you do not present a risk of transmission to your patients and are under no obligation to disclose your status to your patients. At this point, there are only two recommendations in the "Proceedings of the Consensus Conference on Infected Health Care Workers: Risk for Transmission of Bloodborne Pathogens" that should be of concern to you. The first one states that non-responders should be screened annually, and the second goes on to say that if you were to refuse screening you should be presumed to be HBeAg positive and be referred to the expert panel for a review of your practice.

According to the LCDC, if you decided not to be tested, or later turned out to be HBeAg positive, you still would not be obliged to disclose your status to your patients. Recommendation 1 of the section of the report, titled "Disclosure to Patients," reads:

Provided that the infected Health Care Worker's (HCW) health status and the exposure-prone procedures have been assessed by the expert panel and all the panel's recommendations are followed, disclosure of a HCW's infected status before an exposure-prone procedure is carried out is not required as a way of protecting patients from bloodborne pathogens.

Because LCDC only has an advisory role in these matters, the publication of this report has not created any new obligations for Canadian dentists. Your provincial dental regulatory authority now has to decide if they choose to implement these recommendations. You should, therefore, stay in close contact with your regulatory authority.

Benoit Soucy, DMD, M.Sc.
Manager, Professional Services,
Canadian Dental Association

Scientific Information On the Internet

I was recently asked to write an editorial on evidence-based dentistry for a major journal. In my on-line discussions with the editor hundreds of miles away, it occurred to me that applying the principles of evidence-based dentistry in day-to-day practice would have been nearly impossible just three years ago, before easy access to the Internet became widely available.

Who, outside a teaching centre, has the time to go to a major medical library, and sit for hours reading journals? The library may not even carry the journal with the best evidence and, frankly, you'd rather be golfing.

Until the arrival of the Internet, being "up-to-date" meant that you attended lectures and took the word of whoever was speaking, almost as gospel. You read articles in the three or four journals to which you subscribed, which may or may not have been refereed. That was about it. Well times have changed in the world of scientific information, and you now need to be on the Internet to be "up-to-date."

In my opinion, the concept of evidence-based decision making in medicine and dentistry is an idea whose time has come. It is being demanded by our patients (who also have Internet access), by those paying the bills, by law and as an increasingly important delineator between "professional" and "alternative practitioner." If you are not aware of the concept, you need to learn.

You can now access "Medline" at no charge via your desktop computer. This puts you into the National Library of Medicine database with millions of volumes of journals at your command. You can do quick searches using key words of any subject, and receive abstracts of every one of them. Some services will even give you



Start
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have cause to celebrate.

As the leader of the dental health team, you make the call regarding your patients' orthodontic needs. The sooner you can identify the need, the better, because many serious orthodontic problems can either be prevented or more easily corrected if detected before jaw growth has slowed. That's why it's so important that all children get an orthodontic screening no later than age seven. And if no problems exist, parents can enjoy peace of mind.

The AAO, through news coverage and national TV advertising, is urging parents to

take their children for early orthodontic screenings. You'll have the opportunity to conduct more early screenings, or to refer patients to an orthodontist for screenings. You may want to ask your orthodontic colleague for a presentation or literature on orthodontic diagnostics. Or you can contact the AAO at (314) 993-1700 or our web site, www.braces.org.

With early orthodontic screening, you can give your young patients a head start on a healthy smile.



American Association of Orthodontists

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full text articles to print or save on disk. Abstracts give you the "methods and materials" to allow you to pick articles based on good scientific method, which you can then order in full text from the CDA.

Four good online sources for free Medline Access are:

<http://www.medscape.com>

<http://www.ncbi.nlm.nih.gov/PubMed/>

<http://www.healthgate.com>

<http://www.intellihealth.com>

Good Internet sources for evidence-based dentistry are:

<http://www.bhaoral.demon.co.uk/ebd1.htm>

<http://hiru.mcmaster.ca/ebm>

<http://www.hiru.mcmaster.ca/coc/hrane>

<http://cebmr.jr2.ox.ac.uk>

Get on the Internet if you aren't already using it. It's so much more than just the well-publicized idle chit chat, pornography and games. Your patients are there, and if you aren't, they may know more than you.

Peter Neilson, DDS
LaSalle, Ont.
pneilson@mnsi.net

Editor's Comment

Anyone who has read my editorials knows that the points raised by Dr. Neilson are very close to my heart. The CDA Resource Centre can help members get high quality information rapidly. If you are too busy to do a Medline search, a staff member at the Centre can do it for you. If you need advice on how to conduct your own search, or you need articles sent to you, contact the CDA Resource Centre. Send an e-mail to info@cda-adc.ca or phone 1-800-267-6354, ext. 2223.

Paying For the Benefits Provided By CDA

It is unacceptable that non-member dentists can benefit from an association without paying their share of the costs. In Quebec and

Ontario, where practitioners can choose to be members of either their provincial or national associations, several dentists join neither. This phenomenon leads to political and philosophical debate in organized dentistry, and it has concrete consequences for practitioners.

You probably have colleagues from dental school, who are now practicing in Quebec and Ontario, that choose not to be members of the QDSA, ODA or CDA. Consequently, they contribute about \$23 annually to CDA. Dental regulatory authorities pay this amount annually to CDA on behalf of each licenced practitioner. With this small investment, our colleagues enjoy non-tangible benefits like the Commission on Dental Accreditation of Canada and the ability to practice dentistry in other provinces.

For \$23, they have access to high quality information about dental unit water lines, infection control and the safety of dental materials. They get patient information pamphlets at the same cost as members. They benefit from the CDA's efforts to prevent the taxation of dental benefits. Obviously, \$23 does not cover the cost of these services.

In New Brunswick, we believe that every dentist who benefits from these services should share the costs associated with them. The Canadian Dental Association can't afford to provide these services to practitioners who do not financially support organized dentistry. This is a major concern for a cohesive and unified group of professionals dedicated to providing high-quality dental care for Canadians.

David Petrie, DDS
Tracadie-Shiela, N.B.

Some Suggestions For the Journal

I have just finished reading your latest editorial and have a suggestion about the appearance of the *Journal*. I recommend that you get rid of the glossy paper and go for a matt finish. Glossy paper is difficult to read under artificial

light (e.g. at a desk, in a subway car, on an airplane, in bed, etc.), basically, all the places where we have a chance in our busy day to catch up on our reading.

I am happy to see that no advertisements were placed in the body of the scientific articles for the past few issues of the *Journal*. I recognize that advertisements convey important information to readers, however, dental and medical journals of stature, such as *JADA*, *BDJ* and *CMAJ*, do not place ads within the scientific articles.

I also have some suggestions about the content of the *Journal*. I would like to see a news-type section for component societies, faculties and students. You could incorporate a periodic section that lists dental Web sites of interest and journal articles (especially reviews or meta analyses) in other publications of significant importance (e.g. on amalgam, fluoride and infection control issues).

I also like putting a face to the people I talk to at the CDA, so a periodic section introducing staff and describing their functions would be useful, as would a once-a-year list of staff with their titles and telephone extension numbers.

I hope these thoughts, along with all the others you receive, give you some areas to think about.

Sandra Bennett, BDS, DDPH
Toronto, Ont.

Editor's Comment

I appreciate the comments of all readers and take them very seriously. I will discuss the production issues raised by Dr. Bennett with our printers. The content suggestions are in line with my plans for the *Journal* and *Communiqué*.

Congratulations!

I must tell you that the *Journal* really seems to have "come alive" over the last several months. The articles are interesting, well written, and most important,

Continued on page 656

SYSTEMS FOR SUCCESS

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THOMAS TRINKNER, DDS (Columbia, SC)

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DAVID HORN BROOK, DMD (San Diego, CA)

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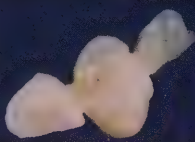


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Meet Dr. Richard Drummond Sandilands — CDA President 1998-99

Teresa Amoroso, B.S.Sc., Dip. J.

Whether it's an issue confronting the dental profession, or a determined fish on the end of a fishing line, Dr. Richard Sandilands is always ready to wade-in and tackle the challenge.

When this avid fisherman isn't enjoying the serene outdoor settings his hobby affords, he's likely to be found, out there somewhere, advancing the concerns and the merits of his chosen profession.

For this native of Minnedosa, Manitoba, getting involved in organized dentistry was a natural progression. "I first became involved in organized dentistry at the grass roots level. I have never been able to sit back and ignore an opportunity to become involved in discussion or debate," says Dr. Sandilands.

"I learned very early in my career that one can stimulate the forces that bring about change more readily by being involved, than by sitting back and watching events happen." All you need to do is look at the course his professional career has charted and it is quite evident that Dr. Sandilands has not been watching from the shoreline.

When he entered practice in 1965, he was one of the youngest dental graduates in the history of the University of Alberta. Today, more than 30 years later, he enjoys the distinction of being one of the school's most successful alumni.

Whether it's been as a practicing dentist (1965-89), clinical instructor and lecturer at the University of Alberta (1974-1994), as chair of the Dentistry Task force to the Premier's Commission on Health Care in Alberta (1987), as interim executive director of the Alberta Dental Association (1994) or as a member of

CDA's board of governors (1988-1992), Dr. Sandilands has spent countless hours in service to organized dentistry. His dedication is partly due to his desire to affect change and it is also a reflection of the respect and enthusiasm he holds for the profession.

"I chose dentistry as my profession for several reasons, all of which are still valid today. There is a great deal of personal satisfaction in the healthcare professions, no matter where one chooses to position one's self. I originally saw dentistry as an honourable profession and I still feel strongly about that," says Dr. Sandilands. "Dentistry has also afforded me the opportunity to work in partnership with my patients to assist them in achieving excellent oral health," he adds.



Dr. Richard D. Sandilands

For 25 years, he practised in Edmonton, first as an associate and then as an owner-partner in both a solo and group practice. In 1989 however, he was forced to retire from wet-gloved dentistry and subsequently launched a new career as a dental management consultant. He has spent the last nine years as a consultant, sharing his expertise and experiences with other dental professionals.

With a busy, thriving career, a new grandchild and another one expected in February, and many hobbies to occupy his time, you might question why Dr. Sandilands continues his involvement and why his dedication to organized dentistry is so steadfast. "The driving force has been my long-standing desire to make a personal con-



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tribution to my profession," he says. "I will do whatever is necessary to maintain and further heighten the standards, which we have collectively achieved so far."

That desire, drive and determination led him to his first experience in the dental politics, when he was elected president of the Edmonton and District Dental Society in 1979. The desire to contribute also led him to the presidency of the Alberta Dental Association and the Western Canada Dental Society. In 1988, he joined the CDA board of governors and went on to become Alberta's representative to CDA's executive council in 1993. In 1996, Dr. Sandilands joined CDA's management team as vice-president.

"The opportunity to participate in the process of change is perhaps the most enjoyable and exciting aspect of organized dentistry, particularly at this time," says Dr. Sandilands, explaining his continued involvement.

While there are numerous significant accomplishments in his dental career, Dr. Sandilands is particularly proud of the role he played, during his career as a clinical practitioner, designing, developing, and implementing a modern, state of the art, large group dental practice in Edmonton. And, his role in preventing the closure of the Faculty of Dentistry at the University of Alberta in 1994 is also another significant accomplishment and source of pride. "No matter what my role has been over the last 33 years, there is no greater satisfaction than in helping make someone or something better than it was when I started," he says. "My desire is to work toward maintaining a high level of integrity and professionalism in dentistry."

It is with that sense of determination that Dr. Sandilands prepares to undertake his year as president of CDA. "I will continue to support the profession's pursuit of excellence and the need for planning and executing the changes needed to ensure a strong future for organized dentistry," he says.



Dr. Sandilands receives the chain of office from outgoing president Dr. Toby Gushue at the recent president's installation dinner.

Dr. Sandilands sees the forces of change placing increasing pressure on the profession and on CDA. External forces like government intervention, the advent of managed care and an increasingly sophisticated public demanding evidence-based information, combined with legislative changes affecting other allied dental workers, are placing stress on the unity of the profession and eventually, will place pressure on the very foundations of dentistry, says Dr. Sandilands. "My biggest challenge, as I see it, is to provide leadership in the proactive implementation of initiatives to deal with the forthcoming change."

In order to achieve this goal, Dr. Sandilands believes there are several important steps along the way. As he sees it, identifying the needs of new dental professionals and establishing stronger relationships with the dental industry, given their impact on the realities of a dental practice, are key. However, continuing the dialogue with CDA's stakeholders, its corporate and individual members and the general public, and working in partnership to find solutions that will be of mutual benefit, will be essential in ensuring future success.

"I plan to focus my energies on relationship building and furthering the goals and vision of CDA," he says. "My primary goal will be to

work to ensure that organized dentistry sets aside its differences and moves on to establishing and implementing initiatives that will serve the needs of all stakeholders."

Dr. Sandilands has no illusions about this daunting task and the challenge that lies ahead, but he is confident that success can be achieved. "Our victory on the issue of the taxation of dental benefits and our current success in keeping the forces of managed care at bay, prove that success can be achieved when we work together, in partnership, to achieve a mutual goal," he adds.

Dr. Sandilands remains extremely grateful for the confidence and trust his colleagues have placed in his abilities. The support and confidence of his wife Marjorie, a successful healthcare consultant in her own right, and his children, Kathryn, a practicing dentist, her husband, Berni, a medical examiner, Bryan, currently studying for his degree in social work, and Bryan's fiancé, Christina, a social worker with child welfare, continue to be an important source of strength.

Armed with this determination and support, Dr. Sandilands is ready to tackle his year as president. And, just in case, he'll have his fishing rod handy, too. ■

NEWS UPDATE

Former Dalhousie Faculty Member To Study Impact Of Innovation and Change In Dentistry

Dr. Amid Ismail has been named a scholar in residence at the Center for Practice and Technology Assessment (CPTA) of the Agency for Health Care Policy and Research (AHCPR) in Rockville, Maryland. His research, while assigned to CPTA, will include the study of how dental leaders view the impact and potential success of evidence based methods on the teaching and practice of dentistry and the design of a survey to measure the impact of innovation and change on the current standards of dental care. He will also participate in on-going activities of AHCPR including the evidence practice centers and the Cochrane Collaboration Centers. The experiences he will gain during his assignment will help our initiatives in outcome assessment, quality assurance, health services research and clinical research. ■

Academy Of Dentistry International Holds Convocation



Dr. Ralph Barolet of Montreal, president-elect, Academy of Dentistry International.

The Canada section of the Academy of Dentistry International held its spring 1998 convocation in Toronto, Ont. With

more than 100 guests in attendance, the Academy bestowed honours on 40 Canadian dentists. Among those honoured were Dr. Nicholas Mancini of Hamilton, Ont. and Dr. James Wright of Winnipeg, Man. Both were named honorary fellows of the academy. Thirty-eight others were awarded fellowship in the academy.

As the respondent for the 1998 class, Dr. Donald Cunningham of Halifax noted the good works of the Academy throughout the world. "It's not fashionable to be altruistic these days, not to say much less to do it, yet as I read the past issues of the Academy's *International Communicator* I was struck by the fact that time and again the fellows of this Academy

go out and do just that," said Dr. Cunningham during his address.

The Canada section will host its 1999 convocation in conjunction with CDA's 1999 convention in Halifax, N.S. ■

Symposium Aims To Transfer Knowledge In Pain Research to Teaching In Dentistry

On March 10, 1999, Simon Fraser University in Vancouver will play host to 22 experts in the field of pain research and clinical management. They will be brought together as part of a symposium entitled: "Orofacial pain: From basic science to clinical management." The participants



"Full Moon Over Candle Lake, Saskatchewan"

Cover Photographer: Kelvin G. Kudryk

This month's featured art is a photograph (double exposure), taken by Dr. Kelvin Kudryk, entitled "Full Moon Over Candle Lake, Saskatchewan". Dr. Kudryk is a graduate of the University of Saskatchewan and currently maintains a private practice in Saskatoon.

He works in both 35 mm and medium format, using transparencies and black and white prints. Having recently completed a darkroom, Dr. Kudryk is concentrating more on black and white photography. The ability to control the printing process allows him more creative control. Among his favourite subjects are his two young daughters, landscapes, nighttime, reportage, architectural and sports subjects.

Many of his pictures adorn his office walls and are often the focus of conversation, for patients, in his office. ■

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WHAT'S IT?

The *What's It?* featured here was recently received at the Dentistry Canada Museum and appears to be a very old and uniquely designed tooth shade guide. About 11 cm in diameter the 26 A-Z hound-shaped teeth are removable and have a remarkable range of colour.

Anyone with information on the manufacturer, age and use of this dental artifact is asked to contact Dr. Ralph Crawford, c/o Dentistry Canada Museum, 427 Gilmour St., Ottawa, ON K2P 0R5. ■



will summarize current knowledge in their area of expertise. This information will also be published in order to make it accessible to teachers, graduate and undergraduate students.

The symposium is being organized by Dr. Gilles Lavigne, from the University of Montreal, Dr. James Lund, McGill University, Dr. R. Dubner from the University of Maryland and Dr. Barry Sessle, from the University of Toronto.

For information and registration please contact Lucille Gendron at gendrol@medent.uomontreal.ca ■

APPOINTMENTS

Newfoundland Dental Association Appoints New President



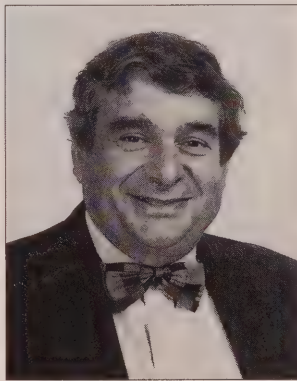
Dr. Marjorie MacDonald, past-president, Dr. Paul W. Walsh, president.

Dr. Paul W. Walsh of St. John's, Nfld., was inducted as president of the Newfoundland Dental Association (NDA) during the Association's annual convention held in

June. A native of St. John's, Dr. Walsh is a graduate of Dalhousie University's faculty of dentistry. He has maintained a private practice for the past 18 years and has also served as chief of dentistry at the Janeway Children's Hospital and lectured in facial growth and development at the Memorial University of Newfoundland. He will serve as the NDA's president for the 1998-99 term. ■

Quebec Dentist Appointed Chief of Oral-Maxillofacial Surgery Department

Dr. Victor Goodyer was recently appointed chief of the Ear, Nose and Throat/Oral and Maxillofacial surgery department of the Laval University Hospital - Pavillon Enfant-Jésus.



Dr. Victor Goodyer

Dr. Goodyer is a graduate of the University of Montreal where he studied under the founder of the oral and maxillofacial surgery department, Dr. André Charest. Dr. Goodyer is president of the

Oral and Maxillofacial Surgeons Association of Quebec. He is also a lecturer at Laval University. ■

Montreal Dental Club Names New Board

The Montreal Dental club has named its new executive board for the 1998-99 term.

Club president Dr. Antoine Chehade will be joined on the board by: Drs. Dac Nguyen (president-elect); Jeff Erdan (past-president); Claudia Giambattistini (vice-president); Roy Foster (treasurer); Evangelia Valavanis (secretary); and Peter Woolhouse (historian archivist) as directors Drs. Sirus Homayun; Spiro Kanatselis; Tommy Karamitsos; Taras Konanec; Lisette McGregor; Brenda Puchinger; and Huy Vu. ■

Canadian Dental Assistants' Association Appoints New President

Former vice-president, Mrs. Lane Shupe was recently appointed president of the Canadian Dental Assistants' Association (CDA). A resident of Kelowna, B.C., she has been active in the local, provincial and national dental assisting organization for the past 25 years. She has held the office of president in both her local and provincial certified dental assistant associations. Mrs. Shupe also participates on several committees for the College of Dental Surgeons of British Columbia and the British Columbia Federation of Dental Societies. Mrs. Shupe assumes the presidency immediately, for a one-year term. ■

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INFORMATION PACKAGE

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This month's information package contains a selection of reading materials entitled **TOOTH BLEACHING UPDATE**. It is available to CDA members for \$5.00 plus applicable tax.

A complete list of information packages is available upon request by calling 1-800-267-6354 or can be easily accessed on the CDA web site at www.cda-adc.ca. Once inside our site, please log into the "CDA Members" area and click on "Resource Centre" and a list of packages can be viewed.

New Acquisitions

Ogle, Orrett E. [editor] *Management of medical problems*. Oral and Maxillofacial Clinics of North America. Saunders, August, 1998.

Vandersall, David C. [editor] *Advances in periodontics. Part II*. Dental Clinics of North America, Saunders, July 1998.

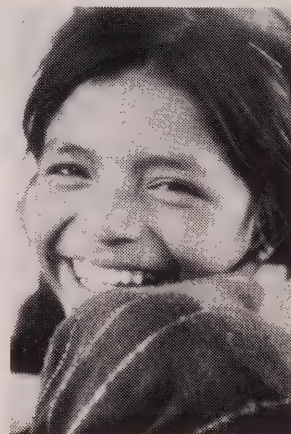
Viazis, Anthony D. *Atlas of advanced orthodontics: a guide to clinical efficiency*. Saunders, 1998.

New Videos

Amalgam alternatives: Parts 1&2. The Registry of Dental Videos. 1995. 3 hrs. Periodontal non-surgical treatment. The Registry of Dental Videos. 1997. 1 hr. 20 min.

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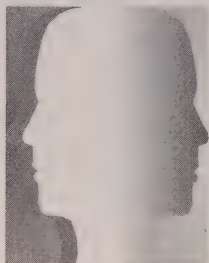
November 13, 1998 - 8:30 a.m. to 4:00 p.m.

For further information, contact: Ms Olga Chodan
CHODAN@MEDCOR.MCGILL.CA (514) 398-7221

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DEBATE



The Looming Geriatric Dental Care Crisis

Brian Barrett, DDS

In my opinion, the biggest problem the dental profession will face early in the next millennium is how to continue providing proper dental treatment to my generation, the so-called baby boomers. I am probably being selfish and could be accused of looking out for myself. So be it, I will have lots of company. It is strange, but it is only after 20 years in practice that I have become acutely aware of this potential problem.

I live in a small town, where I am proud to say, that between my father and myself, our dental practice has dealt with many people over the years. My father began the practice in 1952 and many patients have remained loyal for the past 26 years. Seeing and treating patients over a long period gives you an appreciation of the impact the aging process has on the dentition. I believe I now have a better understanding of this impact than if I had moved from practice to practice, or worked in an office with a high patient turnover rate.

Sadly, I have watched the beautifully restored mouths of some older patients deteriorate rapidly. This is the reason why I am asking for help in defining and quantifying the problem of providing dental care to a burgeoning

geriatric population. I am also looking for solutions to the problem before I also join the ranks of senior citizens.

As a profession, we can be justifiably proud of our work in preventing dental disease and promoting oral health, especially among children and teens. Our young adult patients are keeping their dentitions healthy, and high-tech restorative techniques are enabling us to do the same for middle-aged patients. The real problem for the dental profession is going to be with the baby boomers and the older segment of the population, as they enter seniors' homes with heavily restored dentitions and a high level of dental awareness.

When this group of patients starts presenting with new and recurrent dental disease, it won't seem like we have prevented disease at all. Rather, we will have simply postponed its onset. The mouths of the excellent patients we are treating now, will deteriorate so that they will look like those of patients of 30 years ago, with bombed out molars and rampant decay. This will happen because very slight changes in diet, medications, mental acuity and physical ability will result in disastrous changes in oral

hygiene. Consequently, caries will probably skyrocket.

The current levels of oral hygiene and dietary planning (in terms of preventing caries) in most seniors' residences are unsatisfactory. This, coupled with the fact that many nursing homes and extended care residences do not provide proper facilities for dental treatment, is going to lead to a "dental disaster." I predict that the recurrent decay around many high-quality expensive restorations will be horrendous and, in many cases, these teeth will be unrestorable.

Currently, between 65% and 85% of nursing home residents are edentulous. I believe this figure will change dramatically in the next 10 years. Suddenly, many seniors, in various states of general health, will require unbelievable amounts of restorative and prosthetic dental treatment. This treatment will be performed under the most difficult circumstances imaginable. Most seniors' homes have no dental facilities at all, and unfortunately, many dental offices are not accessible to mobility-impaired patients.

The complicated medical conditions of many seniors, and the fact that they are often taking many medications concurrently,

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make all but the simplest dental treatments medically risky. At the same time, advances in medicine are keeping these people alive longer. Because the dental profession has always been interested in improving everyone's quality of life, I feel we must do something special to help these seniors.

I want to issue a challenge to those in our profession who are particularly knowledgeable in the discipline of geriatric dentistry to come forward at this time of need. With your help, we can encourage our provincial and national dental associations, and federal and provincial governments to begin a discussion about where and how we can attack this problem.

Talk about the millennium bug in computers! The looming crisis in geriatric dental care will be the "millennium bug" for our profession. It could throw off all our projections for future manpower re-

quirements. What will we do if, for one reason or another, our choice of restorative dental materials becomes more limited in the future? I shudder to think!

I don't mean to paint too awful a picture, for the simple reason that I would personally become depressed contemplating my own future. I do, however, want to shake people up enough so that this issue will be examined and dealt with before it is too late. I, for one, have thoughts on some solutions, but the manpower and funding requirements will be staggering.

Faculties of dentistry should amend their protocols for treating aging patients. Facilities for dental treatment will have to be built. I can see a point where, as in medicine, we will have a specialty in geriatric dentistry. The dental profession needs to take the lead, as we have for the last 100 years, and propose solutions that will, in ef-

fect, eradicate the problem. In the truest spirit of the profession, we will work to do away with the need for our services.

Of course, it is unlikely that the need for our services will disappear, but it certainly is an admirable goal for the profession. I am sure that the Canadian Dental Association, as it has done throughout its history, will take a leadership role in solving these problems for me and my aging dentition. ■

Dr. Barrett is executive director of the Denal Association of Prince Edward Island and maintains a private practice in Charlottetown, PEI.

The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the Canadian Dental Association.



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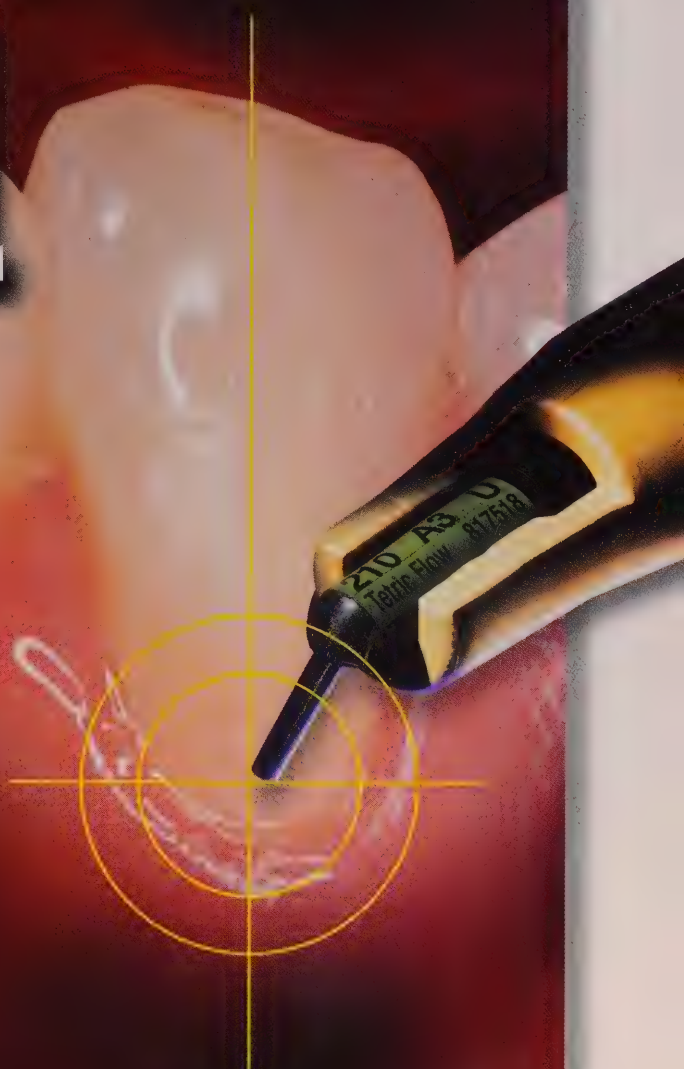
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SELF-LEARNING SELF-ASSESSMENT

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QUESTION 1

In a pregnant patient, which of the following is the highest risk factor for the delivery of a premature, low birth-weight baby?

- A. Alcohol consumption B. Smoking
C. Periodontal disease D. Dental caries

ANSWER: C

RATIONALE:

The management of gingival disease in pregnancy has not been taken seriously. Indeed, it has been common practice to consider that, with the birth of the baby, a mother's gingivitis will subside. Bleeding on probing is the clinical sign of an open portal of entry for bacteria into the deeper tissues of the periodontium and the general circulation.

Recent studies¹ have indicated that oral infection by *Porphyromonas gingivalis* (*P. gingivalis*) in pregnant women will increase the probability of having a premature low birth-weight baby sevenfold. Alcohol consumption during pregnancy increases the probability one and a half times and smoking only by onefold. Smoking and alcohol, in combination, increase the probability by two and a half times.

It is, therefore, imperative for the dental clinician to recognize early signs of gingival and periodontal disease in pregnancy and carry out appropriate therapy to manage the problem.

REFERENCE:

- 1) Offenbacher, S., Katz, V., Fertik, G., et al. Periodontal infection as a possible risk factor for pre-term low birth-weight. *J Periodont* 67:1103-1113, 1996.

QUESTION 2

In periodontal surgery, the modified Widman flap, when compared to a full thickness flap,

1. gives a more pleasing esthetic result.
2. allows for more exposure of the alveolus and the roots of the teeth.
3. results in a more stable treatment outcome.
4. results in a less stable treatment outcome.

- A. 1, 2, 3 B. 1 and 3 C. 2 and 4 D. 4 only

ANSWER: B

RATIONALE:

All treatment of periodontal disease aims at debridement of tooth surfaces to keep the bacterial load below that which will cause tissue loss. In deep pockets, such debridement is best accomplished through access surgery. Of the surgical procedures available, the modified Wid-

man flap approach is the most successful in terms of stability of treatment outcome.¹

The main advantage of the modified Widman flap over other surgical techniques is the ability to create an intimate adaptation of healthy collagenous tissues to all tooth surfaces postoperatively. A marginal new epithelial attachment forms which seals off the deeper tissues. The healing connective tissues adapt as closely to the tooth surfaces as to an implant. Reattachment with the formation of new cementum can develop gradually from the apical aspects of the readapted tissues.

The modified Widman flap, as described by Ramfjord and Nissle, utilizes an intracrevicular incision which permits the ready removal of the sulcular lining. The follow-up open curettage allows easy access to the root surfaces and the alveolar bone crest. This surgical technique results in less exposure of the alveolus and the roots of the teeth. This in turn provides an esthetic advantage postoperatively over other periodontal surgical methods by reducing the potential for additional bone loss.

REFERENCES:

- 1) Loesche, W.J., Giordano, J.R. Treatment paradigms in periodontal disease. *Compendium* 18:221-232, 1997.
- 2) Ramfjord, S.P., Nissle, R.R. The modified Widman flap. *J Periodont* 45:601-607, 1974.

QUESTION 3

A patient presents with a heart murmur and mitral valve regurgitation. Which of the following clinical procedures require(s) prophylactic antibiotics to prevent endocarditis?

1. Periodontal screening and recording (PSR) examination
2. Placement of orthodontic brackets
3. Local anaesthetic injection for an inferior dental nerve block
4. Intraligamentary local anaesthetic injection
5. Placement of rubber dam

- A. 1, 2, 3 B. 1 and 4 C. 1, 3, 5

- D. 1, 4, 5 E. All of the above

ANSWER: B

RATIONALE:

A recent special report¹ from the American Dental Association includes the latest recommendations of the American Heart Association, together with a statement for the dental profession on the prevention of bacterial endocarditis.

Journal

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1998
Vol. 64
No. 9

A periodontal examination such as PSR, in which probing measurement is involved, can cause a bacteremia. This has been dramatically illustrated in a recent Australian study² in which antibiotic prophylaxis is advocated for patients at risk who are demonstrating radiographic evidence of periodontitis. Placement of orthodontic bands on patients with periodontitis will also cause a bacteremia. Cementation of brackets, an alternative approach to care, does not produce bacteremia.

Neither an inferior dental nerve block injection nor placement of rubber dam is included as a clinical procedure requiring prophylaxis. However, endodontics, especially where the apex of the tooth is likely to become involved, requires prophylaxis and so too does the intraligamentary local anaesthetic injection.

It is important to note that the latest American Heart Association recommendation is that the initial amoxicillin dose is reduced to 2 g. A follow-up antibiotic is no longer recommended. Erythromycin is no longer recommended for penicillin allergic individuals, but clindamycin and other alternatives are offered (Table I).

REFERENCES:

- 1) Dajani, A.S., Taubert, K.A., Wilson, W. et al. Prevention of bacterial endocarditis: recommendations by the American Heart Association. *JADA* 128:1142-1151, 1997.
- 2) Daly, C., Mitchell, D., Crossberg, D., et al. Bacteremia caused by periodontal probing. *Aust Dent J* 42:77-80, 1997.

QUESTION 4

In which clinical situation(s) would you place an immediate implant for a permanent maxillary central incisor?

1. A traumatically avulsed tooth just lost
2. A traumatized tooth with a vertical fracture line extending into the apical two thirds of the root
3. An endodontic failure showing an area of apical rarefaction

- A. 1 only B. 1 and 2 C. 2 only
D. 2 and 3 E. 3 only F. All of the above

ANSWER: B

RATIONALE:

If a tooth has been extracted because of failed endodontics, or if a periapical lesion is present, it is advisable to avoid an immediate implant. Instead, a delay is advocated before placement. Although past clinical practice has been to curette a periapical lesion thoroughly and then place an immediate implant, such a procedure tends to retain some periapical pathosis to the detriment of the implant's longevity. Immediate implant placement is, however, indicated in cases of traumatically avulsed teeth and condemned fractured teeth.²

The advantages of placing an implant into a fresh tooth socket are a gain of at least six months for completion of the final restoration, as well as the preservation of greater bone volume at the extraction site. When an implant is immediately placed, there can be difficulty in establishing adequate soft tissue coverage of the exposed implant. Membranes, as used for guided tissue regeneration, have been adopted for this purpose. However, exposure of the membranes to the oral environment has resulted in bacterial penetration into and under the membrane, which can result in implant failure. To this end, Missika et al. suggest a compromise of waiting 4-6 weeks before placement.

REFERENCES:

- 1) Meffort, R.M. Issues related to single tooth implants. *JADA* 128:1383-1390, 1997.
- 2) Missika, P., Abbou, M., Rahal, B. Osseous regeneration in immediate post-extraction placement. A literature review and clinical evaluation. *Pract Periodontics Aesthet Dent* 9(2):165-175, 1997.

QUESTION 5

Which of the following characteristics of cut dentin will affect local adhesion of dentin bonding restorative materials?

Table I

Prophylactic Regimens for High Risk Patients in Need of Dental Procedures

Situation	Agent	Regimen	Regimen Children*
Standard general prophylaxis	AMOXICILLIN	2.0 g orally 1 hour before procedure	50 mg/kg orally 1 hour before procedure
Unable to take oral medication	AMPICILLIN	2.0 g I.M. or I.V. 30 minutes before procedure	50 mg/kg I.M. or I.V. 30 minutes before procedure
Allergic to penicillin	CLINDAMYCIN or	600 mg orally 1 hour before procedure	20 mg/kg orally 1 hour before procedure
	AZITHROMYCIN or CLARITHROMYCIN	500 mg orally 1 hour before procedure	15 mg/kg orally 1 hour before procedure
Allergic to penicillin and unable to take oral medications	CLINDAMYCIN	600 mg I.V. 30 minutes before procedure	20 mg/kg I.V. 30 minutes before procedure

* Total children's dose should not exceed adult dose.

1. Density of dentinal tubules
 2. Dentinal tubular length and size
 3. Degree of dentin sclerosis
 4. Smear layer
- A. 1, 2, 3 B. 1 and 3 C. 2 and 4
D. 4 only E. All of the above

ANSWER: E**RATIONALE:**

The smear layer produced on cutting enamel and dentin contains hydroxyapatite crystals and denatured collagen. It is 1-5 microns thick. Although in part porous, the smear layer is weakly attached to the underlying dentin and, for this reason, new adhesives partially remove and penetrate this layer. In addition, since dentin becomes "wet" with dentinal fluid, the new bonding agents include hydrophilic monomers to penetrate the moisture layer. These hydrophilic monomers penetrate decalcified intertubular dentin for 1-5 microns to make a "hybrid layer" or interdiffusion zone. It appears to be the primary site for dentinal adhesion which is greatly assisted by the hydrophilic components.

There are several primers available to dentin bonding systems such as 4-methacryloxyethyl trimellite (4-META) and biphenyl dimethacrylate (BPDMD). All primers infiltrate and encapsulate collagen fibres of the dentin after these have been exposed by the etchant. Thus, the dentin adhesives that form such a "hybrid layer" exhibit high bond strengths. It is also claimed that, by forming a non-diffusible layer on the dentinal surface as well as in the peritubular dentin, the odontoblast processes are shut down. The dentinal fluid flow is also stopped, and thus postoperative sensitivity is basically eliminated. The invasion of tubules by microorganisms is also prohibited to the benefit of the health of the pulp since it has been shown that such a microbial invasion leads to pulp inflammation and even necrosis.

Another major factor affecting dentin adhesion is the number of tubules available for mechanical retention. Furthermore, the length and orifice size of the tubules will also affect the end result. Since age affects sclerosis of dentin and therefore numbers of available dentin tubules, this should be taken into account when dentin bonded restorations are being considered in the older patient, especially in a Class V restoration.

REFERENCES:

- 1) Kanka, J. Wet Bonding: effect of drying time and distance. *Am J Dent* 9:273-276, 1996.
- 2) Leinfelder, K.F. Current developments in dentin bonding systems: *JADA* 124:40-42, 1993.
- 3) Heymann, H.O. and Bayne, S.C. Current concepts in dentin bonding: focussing on dentinal adhesion factors. *JADA* 124:27-36, 1993.

THIS MONTH'S FIVE NEW QUESTIONS**QUESTION 6**

When restoring a tooth with composite resin where caries has extended close to the pulp, which of the following is/are acceptable?

1. Glass ionomer cement as a base
 2. Calcium hydroxide as a liner
 3. A resin bonding agent to form a "hybrid layer"
 4. Varnish as a liner
- A. 1, 2, 3 B. 1 and 3 C. 2 and 4
D. 4 only E. All of the above

QUESTION 7

When using dental sealants, you would

1. choose a chemically activated resin because it is superior to a light activated one.
 2. apply only on permanent teeth.
 3. avoid application to the adult dentition.
 4. place primarily in pits and fissures.
 5. apply a 37% phosphoric acid etchant for 15 seconds.
- A. 1, 2, 5 B. 1, 3, 5 C. 1, 4, 5 D. 4 and 5

QUESTION 8

Retrograde periodontitis is a condition with all the basic characteristics of periodontal disease.

The loss of attachment produced by retrograde periodontitis is reversible.

- A. The first statement is true, the second is false.
- B. The second statement is true, the first is false.
- C. Both statements are true.
- D. Both statements are false.

QUESTION 9

Which of the following oral conditions most frequently becomes malignant?

- A. Lichen planus B. Irritational keratosis
- C. Nicotinic stomatitis D. Leukoplakia
- E. Leukedema

QUESTION 10

Alveolar bone loss in chronic periodontitis is

1. influenced by genetics.
 2. constant over time.
 3. affected by the host's reaction.
 4. related to lack of antibody production.
 5. caused by specific organisms.
- A. 1, 2, 4, 5 B. 1, 3, 4, 5 C. 1, 2, 3 D. 2, 4, 5

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**Funding for the SLSA program
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Journal

October
1998
Vol. 64
No. 9

CLINICAL PRACTICE



The Use Of Cyanoacrylates In Periodontal Therapy

Jim Grisdale, BA, DDS, Dip. Prosth., Dip. Perio., MRCD(C)

ABSTRACT

N-butyl cyanoacrylate is an effective tissue adhesive which is hemostatic and bacteriostatic. It can be considered an alternative to conventional sutures in soft-tissue surgery. The author presents two cases demonstrating the use of the material. Case One shows its use in free gingival graft surgery. Case Two shows its use post-biopsy.

MeSH Key Words: cyanoacrylates/therapeutic use; periodontal dressings; tissue adhesives.

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Extensive research is available from the early 1960s on dental uses of cyanoacrylate materials. Several forms of cyanoacrylate have been studied for possible use in humans. Alpha and ethyl forms were found incompatible for use in humans. Particular interest has focused on the use of n-butyl cyanoacrylate, which is biocompatible in humans. This material is an effective tissue adhesive which displays hemostatic properties and a bacteriostatic action.

N-butyl cyanoacrylate has several advantages over conventional suture materials in soft-tissue surgery: it saves time, is hemostatic and bacteriostatic, and doesn't need to be removed during post-operative follow-up. Patients must wear eye protection when cyanoacrylates are being applied, as they may cause irreversible retinal damage.

Case One

In my practice, I use cyanoacrylate to facilitate the free gingival graft surgical procedure (Fig. 1(a)). Following preparation of the recipient site, the donor tissue is obtained from the palate.

Cyanoacrylate is then applied as a dressing over the donor site. The material is useful here because of its hemostatic and bacteriostatic properties and because it acts as a protective barrier during the healing phase (Fig. 1(b)).

Following accurate positioning of the donor tissue in the recipient site, I apply digital pressure for approximately four minutes. Using a special applicator, I then apply cyanoacrylate at the coronal border of the recipient site/donor tissue interface, to aid fixation (Fig. 1(c)). The distinctive color of the tissue adhesive, facilitates this part of the procedure. The appropriate applicator allows easy, controlled placement of the material. Care should be taken to prevent the cyanoacrylate from flowing between the juxtaposed tissues. Excess material may be removed by "blotting" with a cotton-tip applicator. One or two layers of cyanoacrylate should suffice to create a bond between the tissues.

A further periodontal dressing may be placed over the recipient site at the clinician's discretion. Post-operative care instructions are

given to the patient and appropriate follow-up appointments are arranged (Fig. 1(d)). The cyanoacrylate material I prefer to use for this technique is Periacryl (Blacklock Medical Products, Delta, B.C.). I prefer it because of its distinctive color, consistency of flow, ease of application and the consistent post-operative results it produces. It is also relatively inexpensive.

Case Two

Practitioners may have the occasion to perform a soft tissue biopsy and submit the sample for histologic examination and diagnosis (Fig. 2(a)). The use of sutures for wound closure may be very difficult or impractical in certain situations. Periodontal dressings may be difficult to apply and retain. Bleeding may also be difficult to control.

In my practice, following the soft-tissue biopsy, I apply a thin layer of cyanoacrylate to the biopsy site. The material is effective as a surgical dressing during the early healing phase. (Fig. 2(b)). Appropriate post-operative care instructions are given and the patient is asked to return for follow-up (Fig. 2(c)).



Fig 1(a): Preoperative view of graft recipient site.



Fig 1(b): Donor site with cyanoacrylate dressing in-situ.

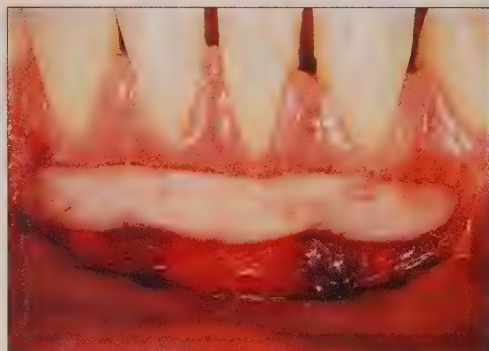


Fig 1(c): Cyanoacrylate anchoring the donor tissue in place.



Fig 1(d): Postoperative view of the healed recipient site.



Fig 2(a): Preoperative view of biopsy site.



Fig 2(b): Cyanoacrylate applied to biopsy site.



Fig 2(c): Healed biopsy site at follow-up.

I have found cyanoacrylate to be useful in several other periodontal surgery applications. These include post-gingivectomy, gingivoplasty and tooth extraction; securing apically positioned flaps; and following ridge preservation procedures using osseous graft materials. ■

Dr. Grisdale is in private practice and is affiliated with the continuing dental education department at UBC.

Reprint requests to: Dr. Jim Grisdale, 805-805 West Broadway, Vancouver, BC V5Z 1K1.

The author has no declared financial interest in any company manufacturing the types of products mentioned in this article.

A full-page photograph of a woman, Chantal Fortier, in a white tennis outfit (sleeveless top and skirt) with red piping. She is captured in a dynamic pose, swinging a tennis racket with both hands. A yellow tennis ball is visible in the air near the racket head. She is wearing white socks and white sneakers with red accents. The background is a dark, out-of-focus outdoor setting with trees and a fence. The ground is a red tennis court.

She's also a dentist.

Chantal Fortier, Dentist, CDA member and avid tennis player.

Chantal loves a good tennis match. There's nothing she likes more than playing tennis with her friends. Except maybe her career. That's why she's a CDA member. CDA allows Chantal to enjoy her free time as much as her profession.

CDA equips young dentists with the resources they need to plan and build successful careers. CDA's annual convention provides valuable networking opportunities, practice management seminars, and exposure to the latest in dental technology. The CDA Resource Centre, Journal, Communique and website are powerful communication tools relaying the latest information on clinical and professional issues affecting Canadian Dentistry today. CDA's initial role as coordinator of national issues, such as the development of Clinical Practice Guidelines, ensure the future security of the profession is being protected. So when Chantal plays tennis, all she has to concentrate on is whether that ball will be in...or out.



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PROFESSIONAL ISSUES



Canadian Consensus Conference On the Appropriate Use Of Fluoride Supplements For the Prevention Of Dental Caries In Children

Hardy Limeback, PhD, DDS
Amid Ismail, BDS, MPH, DrPH
David Banting, DDS, PhD
Pamela DenBesten, DDS, MS
John Featherstone, M.Sc., PhD
Paul J. Riordan, BDS, MPH, PhD

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Background

Dental fluorosis is an early sign that children have ingested more than optimum amounts of fluoride. Water fluoridation has been in use for more than 50 years. In most developed countries, the prevalence of dental caries has dramatically decreased among the population, from the levels seen in the first six decades of this century. The decline has occurred in both fluoridated and non-fluoridated areas and there is a consensus among experts that the widespread availability of fluoride in water, toothpaste, gels, mouth rinses and other products has had a significant role in causing this decline.

The decline in the prevalence and severity of dental caries has also occurred in Canada, where there is evidence that dental caries are more prevalent in Canadians with low education status (less than 12 years of education) than those with high education status (college or university education). The shift and clustering of dental caries and the increase in the prevalence of dental fluorosis in

Canadian children, led some experts to question the rationale for the routine and universal application of fluoride products.

An April 1992 conference, co-chaired by Drs. Chris Clark and Hardy Limeback, involving fluoride experts from Canada and the United States, resulted in the proposal of several new guidelines for the appropriate use of fluoride products. A major recommendation called for the severe restriction of fluoride supplements associated with the development of dental fluorosis.

The 1992 revision of the Canadian recommendation for fluoride supplements was proposed for the following reasons: widespread use of fluoridated toothpastes in Canada and evidence that young children ingest approximately one-third of the paste placed on the toothbrush; increased availability of fluoride in bottled soft drinks and other fluids in Canada; weak scientific evidence supporting the effectiveness of fluoride supplements; the finding that children of highly educated parents have multiple exposures to fluoride prod-

ucts early in life; and the observation that the daily use of fluoride supplements is difficult to follow by population groups who have high prevalence of dental caries. It is believed that fluoride supplements taken in single daily doses, in tablet or lozenge form, increase the risk of dental fluorosis more than fluoridated water because the tissues forming tooth enamel are highly sensitive to fluoride levels in the serum or the bone.

The 1992 Canadian fluoride conference resulted in a more conservative fluoride supplement schedule. This schedule was subsequently approved by the Canadian Dental Association (CDA). The CDA recommended that fluoride tablets not be given to babies and toddlers (birth to 3 years) and that 3 to 5-year-old children living in areas where the fluoride in the drinking water is less than 0.3 parts per million, should receive 0.25 mg of fluoride per day (or 0.5 mg of fluoride per day if fluoridated toothpaste is not used regularly). While most health care professionals accepted this new

schedule, others, including some in the dental profession, continued to recommend the American Dental Association (ADA) fluoride schedule to Canadian residents.

This has raised a number of legal and academic questions, the main one being: should fluoride supplements in tablet form continue to be recommended for small children whose front teeth are susceptible to dental fluorosis, and if so, what fluoride schedule is most appropriate?

Thus, despite a five-year period of adjustment after the CDA endorsed the recommendations of the 1992 fluoride conference, the confusion about which fluoride supplement schedule was most appropriate for Canadians was still not resolved. Early in 1997, CDA invited Dr. Hardy Limeback to organize a follow-up international conference to examine the current literature and determine if any further modification should be made to existing fluoride recommendations.

Prominent clinical scientists were invited to thoroughly re-examine the evidence for and against the use of fluoride supplements, present their findings in comprehensive reviews (to be published elsewhere), and develop new and more appropriate recommendations, with a particular focus on fluoride supplements. Additionally, the CDA involved representatives from various dental, medical and pharmaceutical organizations in a consensus building process. The ADA was invited but declined to send a representative. The pediatric medical specialists (Canadian Pediatric Society) were represented at this conference but the Canadian Medical Association was unable to send a representative.

The following is a summary of the conference held in Toronto on November 28 and 29, 1997. Brief explanations of the agenda and the recommendations that resulted from the conference are presented in this *Journal* article. Full conference proceedings will be published in an upcoming issue of *Community Dentistry and Oral Epidemiology*.

Scientific Presentations

These participants were charged with developing new guidelines for fluoride use, in Canada, based on their analysis of the current evidence.

1. John Featherstone

A review of how daily low doses of fluoride from fluoride supplements (and fluoridated water) work to prevent and control dental caries.

2. Pamela DenBesten

A review of how the biological mechanism of low daily doses of fluoride causes dental fluorosis.

3. Amid Ismail

A review of the clinical evidence showing fluoride supplements are a primary risk factor for dental fluorosis in non-fluoridated areas.

4. David Banting

A review of the fluoride supplement recommendations in countries outside North America.

5. Hardy Limeback (Conference Chair)

A re-examination of the pre-eruptive and post-eruptive mechanism of the anti-caries effects of fluoride.

6. Paul J. Riordan

A risk-benefit analysis of fluoride supplements for young children, with a focus on preschoolers (children 5-years-old or younger).

Representatives of Organizations (additional voting participants in the consensus building process)

Dr. Jim Tynan, College of Dental Surgeons of Saskatchewan

Dr. Anil Joshi, New Brunswick Dental Society

Dr. Olva Odium, Manitoba Dental Association

Dr. Gordon Thompson, Alberta Dental Association

Dr. Robert MacGregor, Nova Scotia Dental Association

Dr. Michel Levy, Montreal Public Health Department

Dr. Nina Wang, Norwegian Board of Health

Ms. Frances Hachborn, Canadian Pharmacists Association

Dr. John Godel, Canadian Pediatric Society

Dr. Pierre Gagnon, Order of Dentists of Quebec

Dr. Lawrence Yanover, Canadian Academy of Pediatric Dentistry

Dr. James Leake, Canadian Association of Public Health Dentistry

Dr. Christopher Clark, College of Dental Surgeons of British Columbia

Other, non-voting CDA participants, included Mr. Brian Henderson, Dr. Benoit Soucy (conference co-organizer), Dr. Louis Dubé, Major Euan Swan and Dr. John O'Keefe (Editor, *JCDA*). Dr. O'Keefe moderated the second day of the conference. Many observers, including some members from the organized anti-fluoride movement, also attended the conference.

All scheduled scientific presenters delivered their papers on the first day of the conference, and the group discussed the current scientific evidence on the risks and benefits of fluoride supplements. On the second day, representatives of participating organizations made brief presentations outlining their own fluoride supplement recommendations and how these recommendations were developed.

Development Of More Appropriate Fluoride Recommendations

The scientific presenters were then charged with developing appropriate fluoride supplement recommendations based on the latest scientific information. They were, however, asked to be sensitive to the legitimate concerns of the various health care providers, especially those organizations of specialists (e.g. pediatric dentists and pediatricians) focusing on protecting the dentitions of children, ages three or younger.

Modification Of the New Recommendations and the Consensus Building Process

The scientific presenters and organization representatives were then given the opportunity to discuss the recommendations in an open session (with input from the observers). Modifications were

Table 1
Quality Of Evidence and Classification Of Recommendations

Level of Evidence	Description
I:	Evidence obtained from at least one properly randomized controlled trial.
II-1:	Evidence obtained from well-designed controlled trials without randomization.
II-2:	Evidence obtained from well-designed cohort or case control analytic studies, preferable from more than one centre or research group.
II-3:	Evidence obtained from comparisons between times and places with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of treatment with penicillin in the 1940s) could also be included in this category.
III:	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees.
Recommendations for preventive manoeuvres	
A	There is good evidence to support the recommendation.
B	There is fair evidence to support the recommendation.
C	There is poor evidence to support the recommendation, but a recommendation could be made on other grounds.
D	There is fair evidence to support the recommendation of exclusion.
E	There is good evidence to support the recommendation of exclusion.

made to the recommendations. After consensus building through further modification of the recommendations, the group at the table was asked to vote on the acceptance of the new recommendations. Consensus was achieved with only one abstention (vote not registered by one participant who left early).

The following is a summary of the consensus recommendations developed at this fluoride conference. These recommendations were widely circulated to the various dental professional organizations, as well as the medical and pharmaceutical professions, for feedback before submission to CDA's board of governors for approval. At the CDA board meeting in March of this year, the new fluoride supplementation schedule was approved (see *J Can Dent Assoc* 1998; 64:339-41). It must

be noted, however, that at the time of writing, the CDA board of governors has not endorsed all the recommendations of the conference. Health care professionals would be well advised to take into consideration the recommendations and footnotes that accompany the fluoride schedule before implementing its use on individual patients and groups at risk for developing dental decay.

Conference Recommendations For Daily Fluoride Supplements (Fluoride Drops, Chewable Tablets and Lozenges)

Underlying Considerations:

The numerals in brackets following a statement reflect the level of the evidence used to support the specific affirmation. The hierarchy of levels of evidence (see **Table 1**) is obtained from

Canadian Task Force on the Periodic Health Examination: The periodic health examination: 2. 1987 update. Can Med Assoc J 1988; 138:618-26.

1. The primary mechanism of action of fluoride to prevent dental decay is topical. (Evidence level II-3, Recommendation B).¹⁻³
2. Water fluoridation is an effective delivery method of topical fluoride. (Evidence level II-1, Recommendation B).⁴⁻⁶
3. Fluoridated toothpaste is an effective delivery method of topical fluoride (Evidence level I, Recommendation A).⁷ The CDA guidelines for appropriate use of fluoridated dentifrices are recommended (a pea size amount of toothpaste or gel used to brush the teeth at least twice a day).
4. Ingestion of more than the recommended daily dose of fluoride is associated with an increased risk of dental fluorosis. (Evidence level II-2, Recommendation E).^{8,9}
5. In the absence of adequate topical fluoride exposure (e.g. fluoridated toothpaste or water) additional fluoride products may be provided in the form of drops, chewable tablets or lozenges. The effectiveness of these products in preventing dental caries is low in school-aged children (Evidence Level II-2, Recommendation C) and is not well evaluated in infants and toddlers. (Evidence level II-3, Recommendation C).¹⁰
6. In the case of very high carious challenge, the use of topical fluorides alone may be insufficient to prevent caries (i.e. additional fluoride may produce no net benefit and other measures such as anti-microbial therapy and diet change may be required). (Evidence level III, Recommendation C).¹¹

Algorithm For Fluoride Supplement Usage

The following decision-making protocol is recommended for use by qualified health care providers

Table II

Dosage Of Daily Fluoride Supplement Based On Fluoride In Water Supply

Age of child	< 0.3 ppm	0.3 - 0.6 ppm	> 0.6 ppm
0 - 6 months	none	none	none
> 6 months - 3 years	0.25 mg/day	none	none
>3 years - 6 years	0.50 mg/day	none	none
> 6 years	1.00 mg/day	none	none

The first visit to the dentist should occur before the age of one year.

Parents must be informed of risk/benefit of fluoride supplements.

Labels on fluoride drops, chewable tablets and lozenges should reflect the above recommended fluoride schedule.

Health care providers should provide written instructions on the appropriate use of fluorides.

in determining the need for fluoride supplements (in this context "child" can mean an individual or a targeted population).

First, ask the following question: Does the child brush his or her teeth (or have teeth brushed by parent or guardian) using fluoridated toothpaste at least twice a day?

If the answer is NO, then supplemental topical fluoride exposure should be provided according to Table II.

If the answer is YES, then answer the following question:

In your judgment, is the child susceptible to high dental caries activity?

If your answer is NO, then fluoride supplements are NOT required.

If your answer is YES, then supplemental topical fluoride exposure should be provided according to Table II. ■

Acknowledgments: The authors thank Benoit Soucy for co-organizing the conference, Richard McCoy, Anne Bauer and Brian Henderson for staff support and John O'Keefe for moderating the second day of the conference. A web site dedicated to this conference (with additional information) can be found at www.interlog.com/~hardyl

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CLINICAL PRACTICE



Rationale For Retention Following Orthodontic Treatment

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ABSTRACT

Maintaining the treatment result following orthodontic treatment is one of the most difficult aspects of the entire treatment process. Normal maturational changes, together with post-treatment tooth alterations, conspire against long-term stability. This article discusses the need for retention and provides an overview of retainers which enjoy widespread use.

Clinical Significance

Permanent retention is increasingly being recommended as the only way to ensure long-term stability of an orthodontic treatment result. Dental practitioners should be familiar with the rationale for retention and the design of the appliances worn by their patients.

MeSH Key Words: orthodontics; corrective orthodontic retainers; orthodontic wires; tooth movement; malocclusion/pathology; malocclusion/therapy; orthodontic appliances.

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This article has been peer reviewed.

Introduction

Retention following orthodontic treatment has been defined by Moyers as, "The holding of teeth following orthodontic treatment in the treated position for the period of time necessary for the maintenance of the result."¹ The retention phase is considered by some to be one of the most difficult aspects of the entire orthodontic treatment process. Oppenheim's statement in 1934 that, "Retention is the most difficult problem in orthodontia; *in fact it is the problem*,"² still holds true in many cases today.

The rationale for holding the teeth in their treated position is to:

- allow for reorganization of the gingival and periodontal tissues;
- minimize changes due to growth;
- permit neuromuscular adaptation to the corrected tooth position; and
- maintain teeth in unstable positions (sometimes necessary due to compromise or esthetics).

Before a discussion of changes related to orthodontic treatment, a review of normal maturational dentoalveolar adaptation is warranted. During normal development a moderate increase in arch width is seen until the permanent cuspid erupts.^{3,4} From this time, a

reduction in intercanine width is noted.⁵⁻⁷ The intermolar width remains stable from 13 to 20 years,^{1,3,4,6,7} and there is a reduction in mandibular arch length with time.^{3,6-11} An increase in lower incisor crowding occurs during the teenage years, a finding which is more pronounced in females.^{6,7}

The Need For Retention

Several long-term retention studies evaluating arch stability following different treatment modalities have been carried out. Similar long-term alterations in arch form are reported in most of the treatment groups studied. It is not possible to predict these post-treatment arch changes using vari-



Fig. 1: Bonded multistrand retainer.

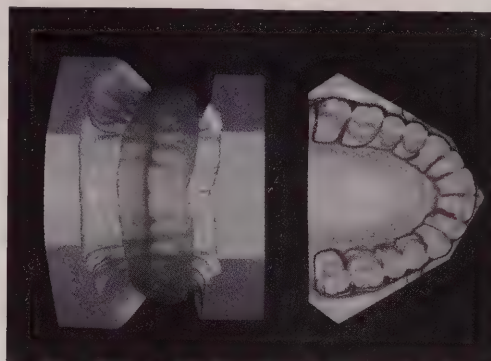


Fig. 2: Custom fabricated positioner.

ables such as Angles classification, length of retention, patient's age, gender, pre-treatment overbite, overjet, arch width or arch length.

Following orthodontic treatment, a reduction in arch length and intercanine width is evident. Intermolar width, if expanded during treatment, tends to return toward the pre-treatment value. The reported changes in intercanine and intermolar width are greater in the mandibular arch than the maxillary arch. Although most of the arch changes are seen before age 30, mandibular anterior crowding continues into the fifth decade. As summarized by Little,¹² "Treated cases should be viewed as dynamic and constantly changing, at least through the third and fourth decade and perhaps throughout life."

Most of the treatment modalities studied showed very poor long-term post retention, with more than one-quarter of all cases showing marked crowding.¹²⁻¹⁵ Only three treatment modalities showed acceptable long-term results. These were the early mixed dentition treatment without fixed appliance therapy,¹⁶ the non-extraction therapy with generalized spaces,¹⁷ and the lower incisor extraction cases.¹⁸

For these reasons, orthodontists are turning toward permanent retention to ensure stability of post-treatment tooth positions. The biologic aims to be considered when choosing a retainer are:

- maintenance of periodontal support;
- maintenance of optimal oral hygiene; and

- maintenance of functional forces on all the teeth.

Commonly Used Retainers

Bonded Cuspid To Cuspid Retainers

These fixed retainers are constructed from .0195" or .0175" multistrand stainless steel archwire. An indirect technique is used to adapt the wire passively to a working model. The retainer is attached to the lingual surface of the teeth using floss or a specially constructed jig and is bonded in position using a light-cured composite resin. Care should be taken to clear the occlusion during placement in the maxillary arch. Excess bond on the lingual surfaces and at the gingival margins should be carefully removed, and the area polished giving smooth even surfaces which are easy to clean (**Fig. 1**).

The inherent flexibility of this multistrand archwire allows for physiologic tooth movement and prevents bond fracture due to occlusal forces. Periodontal ligament stability is also readily achieved using this non-rigid system.^{19,20} Disadvantages of this mode of retention include possible hygiene difficulties, and localized relapse where there is a partial debond of the retainer. Undetected debonds also carry the risk of decalcification and caries.

While the retainers are in position, the patient should be recalled every six months. Currently, there is much controversy regarding the role of the orthodontist versus that of the referring general practitioner

in this long-term maintenance of fixed bonded retainers.

Positioners

Positioners are elastomeric or rubber removable retainers that are either preformed or custom made. Preformed positioners are available for bicuspid extraction cases and non-extraction cases. Sizes are determined by measuring the mesiodistal dimensions of the six anterior teeth. These preformed positioners cannot compensate for individual variation in the size of the teeth, arch width, arch form or tooth size discrepancies. For these reasons, they should only be used temporarily, if at all.

Custom-made positioners are fabricated on articulated models in which teeth from both arches have been sectioned from the models, realigned and waxed in an ideal configuration. This incorporates minor corrections in tooth position and occlusal relationship. The elastomeric or rubber material is then formed around the teeth and the coronal portion of the gingiva (**Fig. 2**).

Positioners are worn full time for the first two days, and for four hours daily plus during sleep after that. For the four hours of wear, patients are advised to repeat a cycle of biting and clenching for 20 seconds followed by a rest of 20 seconds. If this routine is followed, the desired tooth movements should have occurred in the first three weeks and the positioner becomes a passive rather than an active appliance.

Disadvantages of this technique include the cost and delay

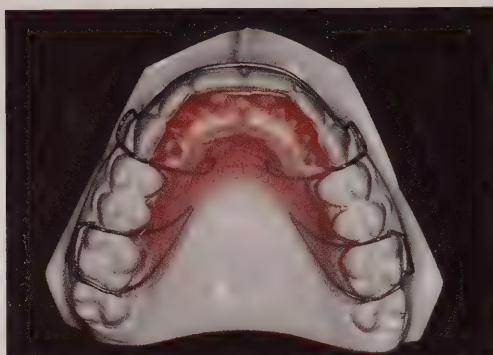


Fig. 3: Hawley retainer.

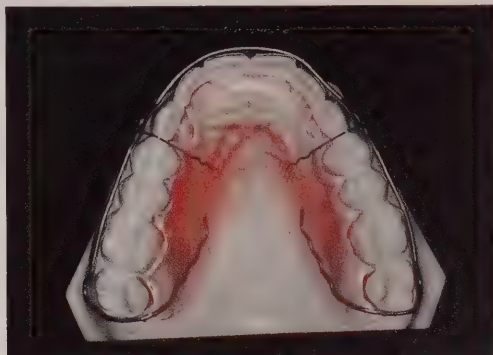


Fig. 4: Wrap around retainer.



Fig. 5: Barrer retainer.

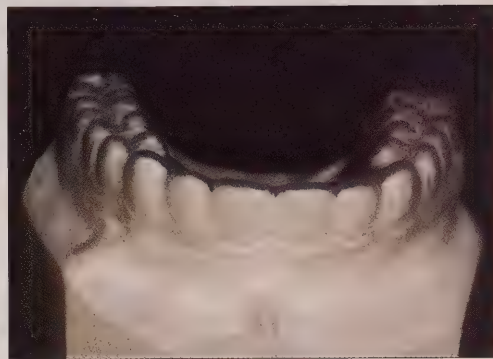


Fig. 6: Essix retainer.

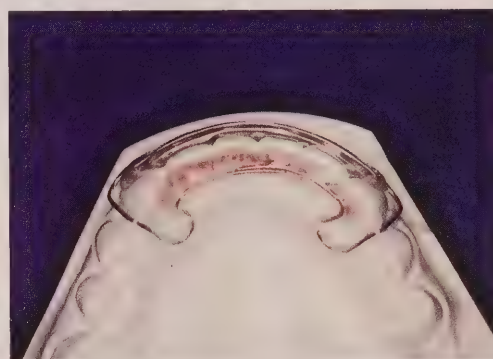


Fig. 7: Spring retainer.

in fabrication of the appliance, the inability to hold rotational and overbite corrections, and the general lack of patient compliance and acceptance.

Removable Acrylic Retainers

These include Hawley retainers (**Fig. 3**), wrap around retainers (**Fig. 4**) and Barrer retainers (**Fig. 5**) and are constructed from a wire framework and acrylic baseplate. They can be modified for active tooth movement by activating the labial bow or by incorporating

springs. They are routinely worn full time for three to six months, part time for one year to 18 months, followed by continued wear twice a week.

Patients are advised that this pattern should be maintained as an insurance policy against post-treatment changes in the dentition. Disadvantages of these retainers include speech difficulties in the initial period of wear, poor esthetics and a marked dependence on the patient for continued compliance.

Essix Thermoplastic Copolyester Retainers

These clear thin thermoformed appliances (**Fig. 6**) are gaining in popularity for orthodontic retention.^{21,22} Advantages include low cost and ease of fabrication together with patient comfort and acceptability. The recommended retention regimen is the same as with removable acrylic retainers. Due to their inherent flexibility, however, they cannot be used to retain cases in which arches have been expanded during orthodontic treatment.

Spring Retainers

Spring retainers combine the principles of Hawley-type retainers with those of the tooth positioners. A working model is required on which the teeth are aligned. The traditional spring retainer was a sectional appliance using .028" stainless steel contoured to the labial and lingual surfaces of the teeth, incorporating vertical loops passing distal to the canines. Acrylic is added to the

wire following the occlusal and gingival contours of the teeth. When inserted, the retainer springs to engage the malpositioned teeth and move these teeth into the alignment established on the working model (Fig. 7).

Due to the potential for dislodging, swallowing or aspirating the appliance, the design has been modified to include acrylic flanges extending lingually to the first molar and incorporates an occlusal rest. The flange joins the lingual clip via .028" stainless steel wire and does not interfere with the spring action. Spring aligners may also be used with interproximal reduction to correct lower mandibular crowding.

Recommendations For Retention Following Orthodontic Treatment

Retainers should be placed as soon as possible following bracket removal. Retainer wires should not be placed across the occlusion through extraction sites, as spaces may reopen. In the presence of periodontal problems, fixed retention rather than removable is preferred, as removable appliances may lead to pathologic pocket formation in the absence of adequate home care.

The term "change" describes the post-retention tooth position better than "relapse." Change implies that the teeth do not necessarily move back to their former position nor are they stable during the post-retention phase. We should assume that tooth positions will be unstable, rather than stable in the post-treatment phase. For this reason, we should plan to prevent undesirable change.

Patients and parents should be informed of the likelihood of post-treatment changes before treatment is undertaken. Our limitations as professionals and the patients' role in the maintenance of the result should be discussed. The reasons for permanent retention are summarized in the following statements. "Orthodontic treatment may temporarily alter the course of continuous physiologic change and possibly for a time even reverse them; however, fol-

lowing mechanotherapy and a period of restraint, the developmental maturation process resumes."²³

"Patients face a normal physiologic process of arch constriction and crowding and only by some artificial means can we guarantee success post-treatment."²⁴

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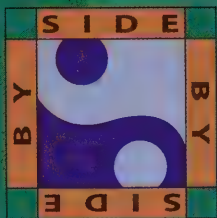
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The authors have no declared financial interest in any company manufacturing the types of products mentioned in this article.

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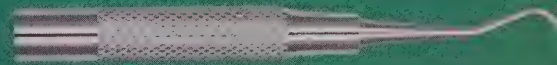
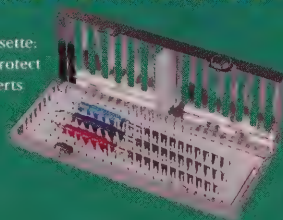
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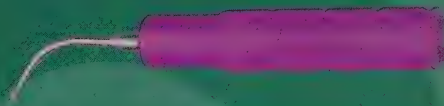
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_____ Gracey 13/14 (SG13/14)	#2	#4
_____ #204S Sickle Scaler (S204S)	#2	#4
_____ Columbia 13/14 (SC13/14)	#2	#4

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_____ #10 Universal (lavender)	_____ Furcation PLUS™*
_____ #1000 Triple Bend (orange)	†(circle one) Straight Left Right
_____ #100 Thin (black)	
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CLINICAL PRACTICE



Gallium Restorative Materials

Dorothy McComb, BDS, M.Sc.D., FRCD(C)

ABSTRACT

Gallium restorative alloys have been developed as an alternative to amalgam. When placed, with meticulous attention to moisture control, small restorations perform reasonably well in short-term clinical trials. However, tarnish and corrosion are pronounced. Results with larger restorations are not impressive.

Sealing of restorations, before and after placement, with a hydrophobic resin sealant is mandatory to prevent excessive expansion, post-operative sensitivity and tooth fracture.

While the profession requires a less technique-sensitive alternative to silver amalgam than resin composite, for difficult and larger posterior situations, gallium alloys in their present state of development do not provide the answer. In fact, the manufacturer of Galloy has voluntarily withdrawn the product from the market, pending reformulation and development of new delivery systems.

MeSH Key Words: dental amalgam; dental alloys; gallium; dental restoration failure.

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This article has been peer reviewed.

Introduction

The search for alternative direct-filling materials to replace silver amalgam, is intensifying. Despite assurances of relative safety, there is continuing controversy over the use of a restorative material containing mercury, and concern about the discharge of amalgam waste.

Tooth-colored resin-composite materials are viable alternatives in many situations, particularly for the post-fluoride dentition. However, they do not provide the necessary handling qualities, durability and longevity required as a replacement for silver amalgam in many posterior situations.

A metallic alternative containing gallium, instead of mercury,

was suggested as early as 1928 in Germany, and has been under development since 1956. The Japanese government, sensitive to environmental mercury after the 1953 Minimata incident, when methyl mercury was discharged and contaminated local fish, approved gallium alloys as dental materials in 1990. The first commercial alloy, Gallium Alloy GF (Tokuriki Honten), was produced in Tokyo.

This liquid gallium alloy, composed of gallium, indium and tin, replaced mercury and was triturated with a spherical alloy powder similar in composition to that used for amalgam restorations, with the addition of 9% palladium. The resulting plastic mix was essentially similar to amalgam and could be

condensed, carved and allowed to harden in a like manner. A major problem with this early product was extreme corrosion. Clinical studies showed substantial sensitivity, discoloration, surface roughness and marginal breakdown, within a short time period.

One study¹ documented 36% failure within eight months due to a combination of restoration fracture, tooth fracture and cracked teeth. An improved alloy, GF II, with a palladium content reduced to 2%, has since been developed, and recently, a new alloy called Galloy (Southern Dental Industries, Australia) of similar composition, was introduced. This was approved for sale in Canada and received FDA approval in the United States in

Journal

October
1998
Vol. 64
No. 9

1995. Galloy uses a spherical, high-copper alloy powder, identical in composition to the company's own silver amalgam powder for the alloy Lorvic. The liquid portion is a gallium alloy containing gallium (62%), indium (25%), tin (13%) and bismuth (0.05%).

Handling Characteristics

Gallium alloys have been reported to be more difficult to handle because they adhere to the walls of the mixing capsule and instruments. The manufacturer of Galloy developed a novel mixing and delivery capsule which allows trituration and dispensing directly into the cavity preparation. Despite this, intra-oral insertion has its problems. Special condensers are recommended to avoid adherence of the alloy to packing instruments. Alcohol on the condenser tip has also been suggested.

In most other respects, the handling characteristics of gallium alloys are somewhat similar to those of a spherical amalgam. However, clinical use is extremely technique sensitive and any moisture contamination during placement has potentially serious consequences due to the resulting alloy expansion.

Physical Properties and Corrosion Resistance

The mechanical properties of current gallium alloys are equal or superior to those of the high-copper amalgams when tested against the parameters of the International Standards Organization (ISO). For gallium alloys, all parameters tend to meet or exceed the requirements for silver amalgam. The compressive strength of Galloy is equivalent to that of Dispersalloy, while that of the spherical amalgam Tytin is higher at early test times. Diametral tensile strength, a more important factor in clinical fracture resistance, has been documented to be higher for gallium alloys.

The creep resistance of the current gallium alloys also complies with ISO requirements. Although this property may have an impact on the rate of marginal breakdown of silver amalgam, there is sub-

stantial debate about whether corrosion is a more important factor. Gallium alloys show considerably more corrosion^{1,2} than the current high-copper silver amalgam alloys, which have benefited from many decades of intense research and refinement. Current high-copper zinc containing alloys, have the highest resistance to corrosion, with a 13-year survival rate of 85%, according to a recent analysis combining the results of 14 independent clinical trials.³

Under dry conditions, current gallium alloys appear to comply with traditional testing requirements for dimensional change during setting. However, moisture contamination causes marked expansion of the restoration. Broom et al⁴ reported that water contamination of Galloy during condensation produced dramatic dimensional changes. This resulted in a directive from the manufacturers for strict isolation of the operative field during clinical placement and use of a hydrophobic resin coating above and below the restoration. Excessive expansion of a setting gallium alloy can produce stresses sufficient to crack the tooth. Even exposure to external fluids up to three days after condensation, has shown expansion effects in a recent photoelastic stress study.⁵

Biocompatibility

The major controversy concerning silver amalgam usage emerged after animal studies documented mercury release from restorations. This release is likely caused by disturbance of the surface passivation layer of the amalgam restoration during tooth-brushing and chewing.

Gallium alloys are very prone to corrosion, with the release of large amounts of the element gallium, as well as other metal ions. Immersion tests of various gallium alloys in dilute salt solutions and artificial saliva, shows substantial dissolution of gallium. Gallium alloys will be subjected to the same scrutiny as silver amalgam, regarding element release, absorption, excretion and body burden.

Not a great deal is known about the disposition of elemental gallium. Environmental exposure is currently negligible as it has a low and diffuse distribution in the earth's crust. In 1988, it was reported that the world production of gallium was in the order of approximately 20 tons per year.

Cytotoxicity testing is one of the most fundamental tests for biocompatibility and is one of the first tests performed on a new dental material. In one study using mercury, gallium and indium nitrates, gallium and indium nitrate had no cytotoxic effect on mitochondrial activity of mouse fibroblasts. Another study examined the effects of corrosion products. In the short term, the gallium alloy demonstrated a lower cytotoxicity than the amalgam. After 10 weeks, gallium and silver amalgam displayed similar cytotoxicity. Overall, the cytotoxicity of gallium alloys was found to be less than or similar to that of amalgams.⁶

The human pharmacokinetics of gallium show substantial differences from those of mercury. Gallium is not a normal constituent of body tissues though it may be present in bone for which it has a predilection, in trace amounts. Gallium has a low vapor pressure and is not absorbed through the lungs, nor through the skin. It is however, retained in the lung alveoli. Although the main route of excretion is through the kidneys, the chief storage depot of gallium is bone. Gallium citrate shows slow absorption when placed subcutaneously, with 30-50% eventual urinary excretion and 30-48% skeleton retention.

Gallium has been used in medicine as a tumor scanning indicator and even to treat tumors, due to its ability to disrupt cellular metabolism. It has also been used to treat hypercalcaemia in malignancies, by decreasing calcium content in blood and increasing it in bone, with no evident toxicity to bone cells. Gallium dental alloys have the advantage of not containing mercury but, as stated by Hero and Okabe⁷ in a 1994 review, their biocompatibility is still a controversial

matter and more studies are needed. Similarly, more information is needed on the potential environmental impact of gallium, should usage increase significantly.

Clinical Performance

Few clinical studies have been conducted. One, two and three-year results of a pilot clinical study of the gallium restorative alloy, Galloy, in modestly sized Class I restorations, were published by Osborne and Summitt.⁸ A resin sealant was placed above and beneath the restoration to prevent moisture from contacting the restorative material before total set. Tarnish and corrosion were very evident at one year, but the restorations were judged clinically adequate. By two years, 25 of the original 27 restorations were evaluated in eight patients. All were intact and functioning, but 45% exhibited tarnish and 60% had surface corrosion.

One lingual cusp of a maxillary premolar fractured at 22 months. Although this occurrence was isolated, it was noted that the fractured cusp was next to an extremely small Class I restoration and that this particular restoration was sealed with a dentin bonding agent, not the company's recommended hydrophobic sealer. Patients with existing silver amalgam restorations in the same mouth did not report any galvanic activity. After three years, two more teeth had experienced fracture and the restorations were replaced. The remaining functioning restorations demonstrated a high incidence of tarnish and corrosion.

Use of the same gallium restorative in larger restorations has proved disastrous. In one study,⁹ routine moderate to large Class II restorations, were placed in 48 molars by dentists specially trained in the use of Galloy. Technique followed all manufacturers' recommendations, including a resin sealant for moisture protection. By 15 months, 60% of the Galloy restorations had failed. Of these, 44% of teeth had fractured and 8% of restorations. A further 4% required endodontic therapy and 4%

had to be replaced due to persistent post-operative sensitivity.

The control silver amalgam restorations showed a failure rate of 6.4%, all due to restoration fracture. The authors concluded that the clinical performance of the gallium alloy was unacceptable. Similar results have been reported in a clinical study conducted in Singapore.

Conclusions

Gallium restorative alloys have been developed in an attempt to provide a mercury-free metallic direct restorative material. When placed with meticulous attention to moisture control, small restorations can function reasonably well in short-term clinical trials. However, tarnish and corrosion are pronounced and the long-term effects of this are unknown.

Sealing of restorations, before and after placement, with a hydrophobic resin sealant is mandatory to prevent excessive expansion, post-operative sensitivity and tooth fracture. Even with such sealing procedures, recent clinical studies have shown a totally unacceptable level of untoward clinical sequelae. This demonstrates the importance of thorough in-vitro analysis and appropriate clinical trials before market distribution.

While the profession requires a less technique-sensitive alternative to silver amalgam than resin composite, for difficult and larger posterior situations, gallium alloys in their present state of development do not provide the answer. Indeed, the manufacturer of Galloy has voluntarily withdrawn the product from the market, pending reformulation and development of new delivery systems. ■

Acknowledgment: *The contribution of Dr. Ileana Martino, a former MRC summer research student is gratefully acknowledged.*

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The author has no declared financial interest in any company manufacturing the types of products mentioned in this article.

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CLINICAL PRACTICE



A Brief Overview Of Dental Ceramics

Derek W. Jones, PhD, FIM, C.Chem., FRSC(UK), FBSE

PRACTITIONER'S QUESTION

The labs are always wanting me to try their latest product. It has been a while since I've taken a materials course and I'm pretty rusty. Can you please tell me what is the difference between the various porcelain materials available for crowns?

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Dr. Jones's Answer:

This is a very important question because there have been a number of interesting developments in the field of dental ceramics in recent years.

Some Properties Of Ceramics

Ceramic materials have been used in dentistry for well over 200 years. They are the most biocompatible of dental restorative materials, because they are chemically very stable. Essentially, they are metallic oxides which are in the lowest energy state. This chemical stability is illustrated by the fact that the oldest known artifacts associated with human habitation are ceramic materials such as pottery fragments, which have not degraded with time.

A desirable feature of ceramics is that their appearance can be customized to simulate the colour, translucency and fluorescence of natural teeth. A major problem with the use of ceramics as tooth replacement materials is their very low fracture toughness (the energy

required to propagate a crack), and the fact that fracture occurs at a very low strain of about 0.1%. In other words, the ceramic structure only exhibits a very low flexibility before fracture. Another problem is that if the ceramic structure is formed by the condensation and sintering of fine frit particles, fusion is accompanied by a relatively large firing shrinkage.

Earlier Developments

The earliest successful porcelain systems used conventional feldspathic porcelain, derived from the natural mineral feldspar. This material was used for producing all-ceramic jacket crowns, which were very esthetic. Dental feldspathic porcelain is predominantly a glass material with an amorphous (non-crystalline) structure. Glass mainly consists of a three-dimensional network structure of silica (silicon-oxygen) in which each silicon atom is bonded to four oxygen atoms in the form of a tetrahedron. These tetrahedra are linked together by shar-

ing common oxygen atoms to form a continuous three dimensional network. Other oxides (such as aluminum), may be incorporated to a very limited extent as substitute network formers.

The introduction of oxides of alkali metals (e.g. potassium, sodium and calcium) into a silica glass composition results in disruption of the three-dimensional structure formed by the oxygen-silica bonds. When the alkali metals in the ionic form disrupt the oxygen-silicon bonds (resulting in non-bridging oxygen) the three-dimensional network structure breaks down to some extent, resulting in a lower fusion temperature and a more fluid behaviour during heating. While pure (100%) silica glass fuses at about 1700°C, the introduction of alkali ions disrupts some of the silicon-oxygen bonds causing a more open network structure. The more open network structure has less cross-linkages, causing a lowering of the fusion temperature, together with a reduction in strength and chemical

inertness. Thus, fusion temperature, strength and chemical inertness depend on the amount of alkali (or non-bridging oxygen) present in the glass.

Porcelain fused to metal systems were introduced in the 1950s. A development in 1962 greatly improved these systems; that is, the incorporation of a high proportion of leucite crystals into the feldspathic porcelain composition which veneered the cast gold alloy substructure. The leucite crystals serve to increase the thermal expansion of the porcelain to bring it closer to that of the metal substrate. The leucite prevents stresses occurring, due to a thermal mismatch, which could lower the strength. Metals are between 10 and 100 times tougher than ceramics; the presence of a metal substrate can contribute to a very strong restoration.

The incorporation of a small trace of tin and/or iron into the gold alloy was necessary to allow

formation of the necessary oxide on the surface to permit good wetting by the porcelain and subsequent bonding to the alloy surface.

Base metal alloys were introduced in competition to the gold alloys. These are more technique sensitive than gold, but are now well established. An opaque ceramic such as a titanium oxide glass frit has to be applied as the first layer of veneer, to mask the metallic hue in the porcelain fused to metal systems.

Latest Developments

Although the porcelain fused to metal systems have high strength, the opacity of the metal substructure has encouraged the development of all-ceramic core materials containing crystalline components which are stronger than the traditional (predominantly glassy amorphous) feldspathic porcelain. This type of core material can then be veneered with a more translucent

ceramic material. The core structure for the In-Ceram infiltration system is much stronger than the other all-ceramic core systems.

The all-ceramic systems described in **Table I** are used for producing crowns and inlays.

It is important to note that all of the ceramic materials listed will fracture at approximately the same critical strain (i.e. with the same degree of flexing before fracture) of about 0.1%. The only way that we can increase the strength of such ceramic materials is to make them stiffer — to increase their elastic modulus. This is why the much higher modulus of elasticity of the In-Ceram core material results in a significantly stronger ceramic. The first In-Ceram alumina material produced made use of alumina as the reinforcing phase, in fact, it is much stronger than the newer, more translucent spinel containing In-Ceram (Spinel).



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Table I

All-Ceramic Systems Used For Producing Crowns and Inlays

Type	Description	Process	Examples
Aluminous core porcelain	Dispersion strengthening by high modulus crystalline alumina particles in a glass matrix	Condensation of frit-sintering — veneering with a more translucent feldspathic frit	Vitadur and Hi-Ceram
Leucite-reinforced porcelain	Dispersion strengthening by crystalline leucite particles in a glass matrix	Pressure moulded frit-sintered, veneering with translucent feldspathic frit	IPS Empress and Optec
Glass-infiltrated alumina	Highly filled crystalline alumina — in glass matrix	Slip-cast slurry in porous mould-sintered — infiltration by low viscosity glass — veneered with more translucent feldspathic frit	In-Ceram Alumina
Glass-infiltrated Spinel	Highly filled crystalline spinel-in glass matrix	Slip-cast slurry in porous mould-sintered — infiltration by low viscosity glass — veneered with more translucent feldspathic frit	In-Ceram Spinel
Castable glass	A glass which can be crystallized by heat treatment	Cast using lost-wax investment method followed by heat-treatment to precipitate a crystalline phase	Dicor
Glass-Ceramic CAD-CAM	A glass-ceramic machinable material	Milling (mostly inlays) by computer control	Dicor, MGC and Vitabloc

Glossary

Alumina: High strength crystalline oxides of aluminum.

CAD-CAM: Computer-aided design combined with computer-aided machining. In dentistry, laser mapping of a cavity preparation can be fed to a computer-controlled milling machine.

Dispersion Strengthening: A mechanism by which a crystalline phase of high strength and high modulus of elasticity is dispersed in an amorphous glassy matrix to produce a high strength composition.

Feldspar: A range of natural crystalline minerals of aluminum, silicon and oxygen combined with smaller amounts of sodium, potassium and calcium. The presence of the alkalis controls the softening point of feldspar which is lowered by increased sodium, but increases with potassium content.

Frit: A glass powder produced by rapid chilling from the molten state followed by grinding.

Glass-Ceramic: A composition which could be converted from an amorphous glass to a high strength polycrystalline structure by precipitation when heated within a specific temperature range.

Opacifier: A white or pale cream coloured oxide which is used to decrease translucency and act as a masking agent, often tin oxide or titanium dioxide.

Sintering: The process of fusion by point contact of particles resulting in densification by viscous flow of a ceramic or glass powder, produced by heating or heat and pressure.

Slip-cast slurry: A fine particle ceramic dispersed in an aqueous liquid medium is poured into a porous mould which rapidly ex-

tracts the liquid causing the formation of a close-packed but weak ceramic particle structure.

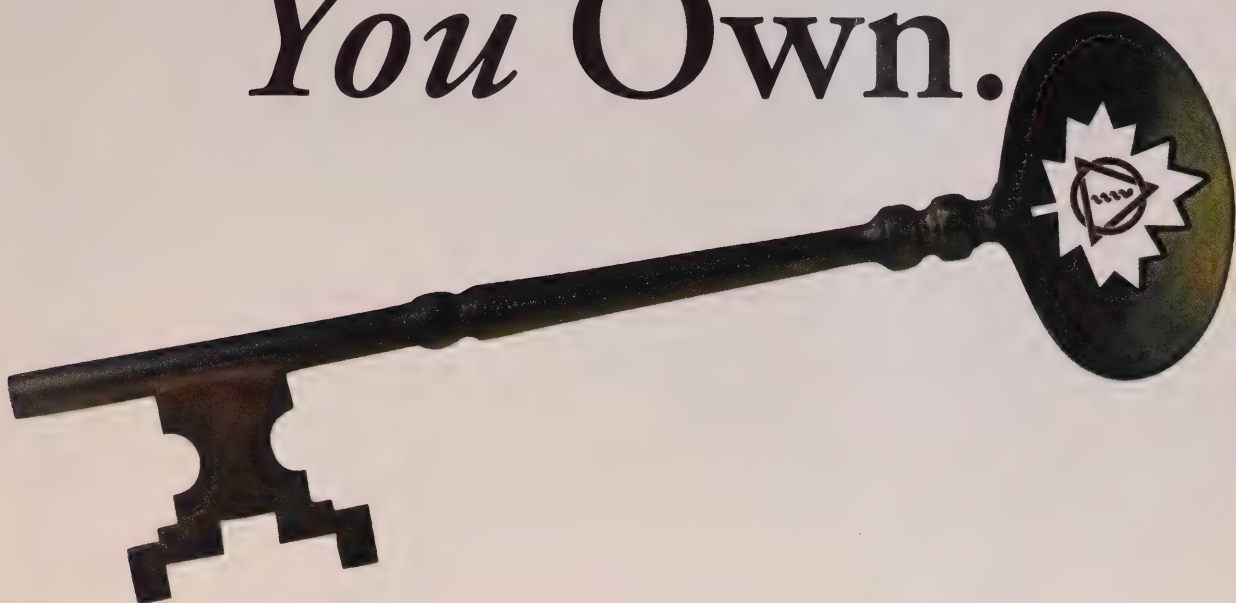
Spinel: A range of compounds with specific crystalline structures, the spinels of recent dental interest are of magnesium and aluminate composition. ■

Dr. Jones is professor of biomaterials, at Dalhousie University, Halifax, Nova Scotia.

The author has no declared financial interest in any company manufacturing the types of products mentioned in this article.

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CLINICAL PRACTICE



Criteria For The Predictably Restorable Endodontically Treated Tooth

Alex McLean, DMD, B.Sc. (Eng.)

ABSTRACT

This paper outlines criteria which allow the clinician to identify endodontically treated teeth that can be restored with a high level of predictability. The intent of the article is not to preclude the restoration of teeth that do not meet these criteria; it is to provide a science-based approach for identifying those teeth with a high probability of long-term success upon restoration.

For an endodontically treated tooth not requiring a post, the requirements are for biologic width + ferule length, (i.e. 4.5 mm of supra-bony solid tooth — dentin a minimum of 1 mm thick after preparation). A tooth requiring a post needs, in addition, enough root length to allow a 4 mm apical seal and a post length — apical to the crown margin, equal to the length of the crown.

It is essential to assess the functional loads to which the restored tooth would be subjected. Teeth that are endodontically treated, or are likely to be in future, should be avoided as abutments supporting precision attachment RPDs, distal extension RPDs or cantilever FPDs.

MeSH Key Words: dental prosthesis design; post and core technique; tooth, non-vital/therapy.

© J Can Dent Assoc 1998; 64:652-6

This article has been peer reviewed.

Introduction

The restoration of the endodontically treated tooth is an important aspect of dental practice involving a range of treatment options of varying complexity. The clinician must be able to predict the probability of restoring such teeth successfully.

Generally, endodontically treated teeth have experienced significant coronal destruction as well as a loss of radicular dentin, secondary to endodontic treatment. There is evidence that these teeth have a reduced level of proprioception^{1,2} which could impair normal protective reflexes. Successful management requires an assessment of the role of the restored tooth in the overall dentition, the load it will have to bear and the status of adjacent teeth. Compro-

mise treatments may have to be considered, due to the cost of treatment or patient discomfort.

The intent of this article is to present a set of criteria which, when met, will indicate a predictably restorable endodontically treated tooth.

Supra-Bony Tooth Structure

The bulk of supra-bony tooth structure is the most critical factor determining the restorative prognosis for a tooth.³ There have been suggestions that endodontically treated teeth are somehow more "brittle" than vital teeth. Research by Helfer⁴ et al has shown decreased moisture content in the dentin of pulpless teeth, the significance of which is not clear.

Huang and Schilder⁵ have shown that the modulus of elastic-

ity (Young's modulus) and the ultimate strength of dentin increase as it dehydrates (i.e. it becomes stiffer). These researchers also showed that ultimate strength in tension and compression, in both vital and non-vital dentin, is essentially identical. Interestingly, they found that Young's modulus of dentin was lower in non-vital teeth than in vital teeth. This evidence does not support the idea that the mechanical properties of non-vital dentin are significantly different from those of vital dentin.

Biologic Width

To have a healthy gingival attachment apparatus, room is required between the margin of the restoration and the crest of bone. Gargiulo et al⁶ found the dimensions of the attachment apparatus to

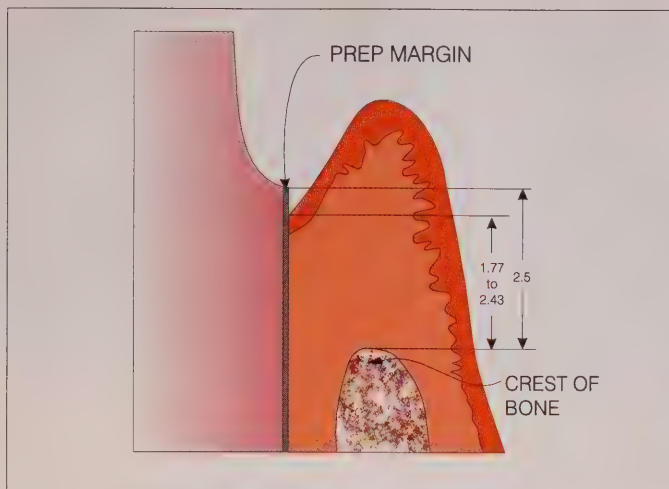


Fig. 1: Biologic width considerations.

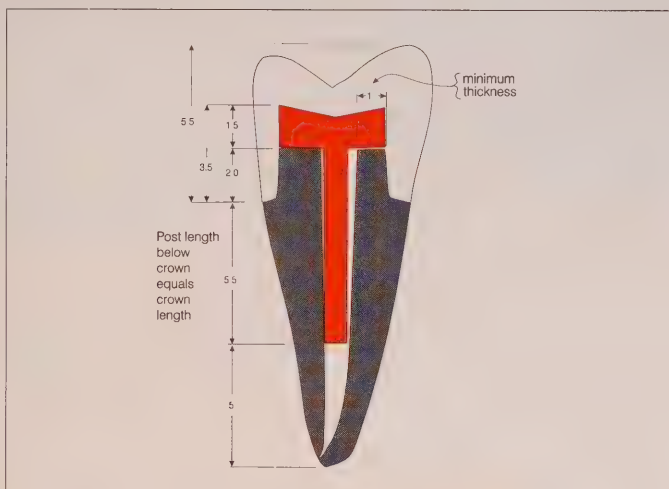


Fig. 2: Minimum dimensions for a predictably restorable tooth.

range from 1.77 mm to 2.43 mm. This means that there should be an absolute minimum of 2.5 mm between the restoration margin and the crest of bone (see Fig. 1).

Fugazzotto et al⁷ and Freeman⁸ have recommended that at least 3 mm be allowed.

An adequate bulk of tooth coronal to the restoration margin is required to restore the tooth. The amount of coronal tooth structure, along with the position of the tooth in the arch, will dictate: the type of build-up indicated; whether a preformed post, or a cast post and core are indicated; and whether a crown is needed.

The Ferrule Effect

With the placement of a crown on a tooth the "ferrule effect" must be considered. A ferrule is an encircling band of cast metal that acts as a reinforcing sleeve around the coronal portion of the tooth. Tjan and Whang,⁹ using a short 60 degree collar, found that this collar did not increase resistance to root fracture. Other studies, such as those of Barkhordar et al¹⁰ and Sorensen and Engelman,¹¹ have shown that ferrules confer significant increases in resistance to fracture. The differences stem from a range of interpretations about what constitutes a ferrule.

Sorensen and Engelman¹¹ define the ferrule effect as a "360 degree

metal collar of the crown surrounding the parallel walls of the dentin extending coronal to the shoulder of the preparation. The result is an elevation in resistance form of the crown from the extension of dentinal tooth structure." Barkhordar et al¹⁰ used a 2-mm long ferrule wall, and Sorensen and Engelman¹¹ a 1-mm long ferrule. Accepting that the ferrule is only effective when the walls are very close to parallel, and allowing for a somewhat rounded transition from ferrule wall to the prep margins, it seems prudent to accept 2 mm of ferrule length as a minimum clinically.

Intact Anterior Teeth

There is a consensus that there is no need to place crowns or posts in anterior teeth (incisors and cuspids) with essentially intact crowns, because posts do not reinforce endodontically treated teeth.¹²⁻¹⁵ In such teeth, closure of the access preparation with a bonded composite resin restoration is all that is required, provided the tooth meets the occlusal requirements and the patient is happy with its appearance.

Posterior and Anterior Teeth Requiring Crowns

Almost without exception, endodontically treated posterior teeth (distal to the cuspid) benefit from cuspal coverage with some form of crown.¹² In addition, many anterior teeth will require crowns for esthetic, structural or occlusal reasons. For such teeth to be successfully restored, there must be a minimum of 4.5 mm of solid tooth structure above the bone crest; given that a minimum of 2.5 mm is required for biologic width and 2 mm for an effective ferrule.

Thickness Of Coronal Tooth Structure

What constitutes adequate thickness of coronal tooth structure is also a subject of some discussion. Sorensen and Engelman,¹¹ and Tjan and Whang,⁹ found that increasing the thickness of axial dentin beyond 1 mm did not increase the strength of the restored tooth. Both showed, however, that

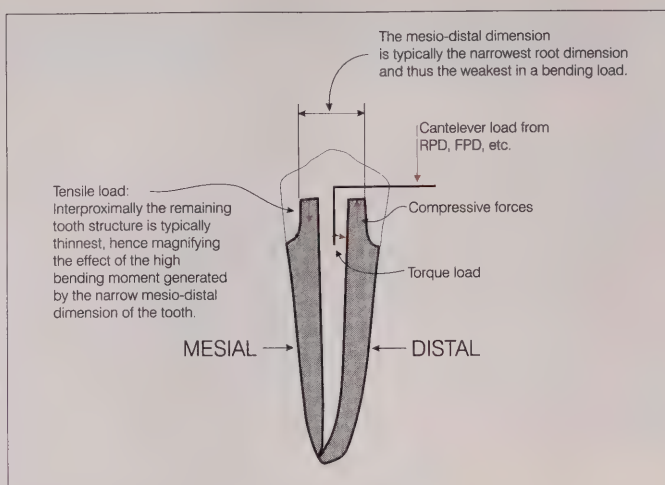


Fig. 3: Effect of bending forces from cantilever loading.

with thicker axial dentin, failure was much more likely to be due to dislodgement rather than root fracture. Tjan and Whang measured the thickness of buccal dentin in their work, while Sorensen and Engelman measured the minimum dentin thickness and did not test teeth with a dentin thickness of less than 1 mm. On some teeth it is virtually impossible to obtain this 1 mm thickness of dentin in the interproximal areas, after both endodontic treatment and crown preparation. However, with careful tooth preparation it can be approached, and in the more important buccal and lingual walls it can usually be obtained.

The work of Hunter et al,¹⁶ using photoelastic models, supports the concept that preservation of coronal dentin strengthens the tooth. Apparently, thicker coronal dentin reduces the odds of failure by fracture of tooth structure and improves the odds that a failure will involve a simple dislodgement of the core. In such a case the tooth can be saved. The evidence indicates that more coronal dentin is better than less.

A 1 mm thickness of axial dentin seems to be the accepted minimum.¹⁷ However, this figure is empirical, based on opinion and clinical experience rather than research. This 1 mm refers to the thickness of dentin between the inside of the canal wall and the

outside surface of the ferrule as shown in Fig. 2.

The Need For a Post

Endodontically treated teeth all require build-ups of some sort, if only to close the access preparation and fill the pulp chamber. Where a crown is to be placed on the tooth as a final restoration, this build-up is often called upon to provide resistance and retention form to the preparation. Retention of the build-up is often accomplished by placement of a post which engages root structure.

Nayyar et al¹⁸ and Kane et al¹⁹ have both described the use of amalgam cores as build-ups for posterior teeth retained by the pulp chamber or by extensions of amalgam into the coronal 2 mm to 4 mm of canal space. Kane et al showed that where 4 mm or more of pulp chamber height remained, there was no advantage to placing amalgam into the root canal space. In addition, even in teeth with only 2 mm of pulp chamber height left, the fracture loads were comparable to those of teeth with 4 mm high pulp chambers.¹⁹ On posterior teeth in which the core build-up can be retained by remaining pulp chamber anatomy there is no need or advantage to placement of a post.

With both anterior teeth and posterior teeth the decision to place a post is based on the an-

swer to the question; is a post required to retain the build-up? The decision to place a post should not be based on the desire to strengthen the tooth. Sorensen and Martinoff²⁰ found no evidence that placement of a post and/or crown on an anterior tooth has a significant effect on the prognosis of the tooth. Where a post is necessary to retain the build-up, the length of the post and the length of the remaining apical seal can greatly influence the probability of the success of the restoration.

Apical Seal

The length of apical seal remaining after post preparation and the degree to which it was disturbed during post-hole preparation can influence the long-term success of the restoration. The realities of post-hole preparation are such that, in most cases, some form of mechanical preparation of the post-hole is required.

There is support²¹⁻²³ for leaving 4 mm to 5 mm of undisturbed apical gutta percha after post preparation. Various researchers^{21,22,24} have reviewed different methods of post-hole preparation and none found an increase in apical leakage attributable to any particular procedure for removing gutta percha. However, Haddix et al²⁵ found significantly less leakage when gutta percha was removed using heated pluggers. The apical seal was much better when 5 mm of gutta percha remained following post preparation, as opposed to when 3 mm remained.

The work of Ouzounian and Schilder²⁶ shows that at a distance of 5 mm from the apex, there is a 1 mm thickness of dentin, before post preparation, only on cuspids, upper incisors, lower bicusps and the palatal root of upper molars. There is consistently less than 1 mm of remaining dentin on all other roots. This underlines the need for careful assessment of each root prior to post preparation.

Caputo et al¹⁷ suggested that a minimum of 1 mm of sound dentin surround the apical end of the post. It is difficult, if not impossible, to measure this thickness

clinically. If this recommendation was followed rigidly, the use of posts in many teeth would be ruled out. Given the high success rate shown with long posts in Sorensen and Martinoff's retrospective study,²⁰ thinner cross-sections of dentin apparently suffice.

Post Length

Standlee et al²⁷ showed retention of passive posts increased directly with length. Morgano²⁸ recommends that the post be as long as possible, while maintaining adequate apical seal. Sorensen and Martinoff²⁰ showed that where post length in the canal was equal to or greater than the length of the crown, the success rate was 97.5%, regardless of post design. The success rate was greater than 97.7% with para-post, even when shorter post dimensions were included. Ideally the length of the post extending into the root should equal the length of the crown.

What Loads Will the Restored Tooth Experience

The load borne by the restored tooth is a major indicator of the success of a restoration. Sorensen and Martinoff²⁹ found in their retrospective study that while the success rate for single unit crowns was 94.8%, the rate was 89.2% for fixed partial denture (FPD) abutments and dropped to 77.4% for removable partial denture (RPD) abutments (both distal extension and tooth born designs). Nyman and Lindhe³⁰ found fractures in abutment teeth occurred more frequently in root treated teeth, and primarily in root treated teeth fitted with posts, serving as terminal abutments for free end segments. Hatzikyriakos et al³¹ found in a three-year retrospective study that the failure rate for endodontically treated teeth used as abutments for FPDs and RPDs was over double that for teeth not used as abutments.

Testori et al³² recommended against anchoring a cantilever bridge on an abutment that was endodontically treated and fitted with a post. Testori also stated that attaching removable partial dentures with extracoronal attach-

ments to individual endodontically treated teeth placed these teeth at significant risk. Abutment teeth for distal extension RPDs are far more likely to experience high bending stresses in a mesio-distal direction than either tooth borne or non-cantilevered FPD abutments. The stresses generated in the tooth structure by such loads can be greater than those of comparable bucco-lingual loading, as most of these abutment teeth are much narrower mesio-distally than bucco-lingually (see Fig. 3).

Based on the available data, the use of an endodontically treated tooth to support a precision attachment RPD, a distal extension RPD or a cantilevered FPD cannot be considered highly predictable. In addition, the use of root treated teeth to support non-cantilevered FPDs must be assessed carefully on an individual basis. Root treated teeth may not be suitable as abutments in individuals with a history of bruxism, or those requiring long span fixed bridges.

Criteria For Successful Restoration

For the endodontically treated tooth requiring a post, the minimum length of remaining solid tooth would be the sum of biologic width (2.5 mm), ferrule length (2 mm), apical seal (4 mm) and a post length (equal to crown length), (i.e. 8.5 mm + post length beyond crown margin) (see Fig. 2).

For those teeth not requiring a post, the requirements are for biologic width + ferrule length (i.e. 4.5 mm of supra-bony solid tooth; this assumes adequate bone support to provide a clinically acceptable level of mobility). In both situations, "solid tooth" refers to dentin at least 1 mm thick after preparation.

In addition, consideration of the functional loads to be borne by the tooth is essential. Single abutments supporting precision attachment RPDs, distal extension RPDs or cantilever FPDs that are endodontically treated, or likely to be in future, should be avoided. Careful assessment of the occlusal demands and other loads, such as from fixed

or removable partial dentures, must be made before restoration. Endodontically treated teeth that meet these criteria can be restored with a high degree of confidence.

Discussion

There is a limited amount of research that correlates structural and endodontic failure of teeth to the types of load they experience. Studies involving a large number of teeth looking at the impact of such load factors could be an invaluable aid to assessing what will and won't work in clinical situations. The decision to place a crown, or crown and post on anterior root treated teeth is a difficult one; current evidence is inconclusive on the value of crowns and posts in these situations. This is an area where a large well-designed study could help guide the clinician. Many teeth don't fall within the guidelines outlined here, and yet need to be restored. There is a very real need for guidelines on restoration of these teeth and for ways to assess the level of predictability associated with such restorations. ■

Dr. Alex McLean is in private general practice in Kamloops, British Columbia.

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The author has no declared financial interest in any company manufacturing the types of products mentioned in this article.

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LETTERS

Continued from p. 614

applicable to what we are doing. I find that I refer the clinic dentists to recent material in the *Journal* at almost every meeting. Congratulations, you're doing a wonderful job building a relevant professional information-exchange medium.

E. Luke Shwart, DDS
Calgary, Alta.

The On-line Journal

I surfed over to the CDA *Journal* home page and was very impressed. I think this will be a great way to influence more dental offices to go "on-line" now that you can access the CDA *Journal*, the CDA, ODA and other great dental Web sites on the Internet. It would solve the problem of whether one should keep their journals at home or at the office. I think you and your staff have done an excellent job here. The pages are easy to read and not too "busy." There are numerous useful and interesting links, access to current and past journals, and other CDA resources is easy and fast.

Ron Brierley, DDS
Lindsay, Ont.

Excellent work. A nice layout. The graphics could be omitted (or summarized).

I like it a lot. I actually read all the contents and summaries within five minutes.

Amid I. Ismail, BDS, PhD,
The University of Michigan
Ann Arbor, Mich.

The on-line *Journal* is excellent. A very strong point is access to previous journals. However, I don't think it should be a replacement for the paper copy. There is something cozy and efficient about being able to open a journal while sitting in the old rocking chair, or wherever.

Philip A. Watson, DDS, M.Sc.D.
Toronto, Ont.

The on-line *Journal* looks great. Congratulations!

Jocelyne S. Feine, DDS, HDR,
Montreal, Que.



Getting Our Message Across

Burton Conrod, DDS

A recent review of CDA communication activities, conducted by the committee on communications and membership, concluded that although every opportunity to expand our electronic communications vehicles should be seized, the emphasis in the near-term should remain on printed communications. The steering committee on dental benefits issues (SCDBI) has developed two new tools to assist in the communications aspect of our work – one printed and one electronic.

Last year, SCDBI recognized the need to streamline messaging on the negative consequences of managed care plans and the necessity for dentistry to support acceptable methods of cost containment in dental benefit plans to dentists, patients and plan administrators. The next logical step was to position CDA as a resource to the plan purchasers. Employers, both large and small, who purchase dental benefits for their employees, must understand dentistry's concerns with issues such as: freedom of choice, quality of care and access to preventive dental services. In order to facilitate consistent delivery of these messages to employers across the country, a resource package for CDA and provincial dental association staff and committee members,

was required. The package would also have to be flexible enough to adapt to different needs and concerns in the various provinces.

CDA's communications department integrated the positions and information developed by the practice management support services (PMSS) department and produced a professional portfolio of brochures combining the right medium and messaging to accomplish the task. The Employers Information Kit portfolio, contains a number of colour pamphlets and booklets, as well as a meeting agenda and contact lists of CDA and provincial association staff and committee members. The portfolio allows for a customized meeting agenda and contact lists, in addition to a choice of booklets such as *Dental Plan Alternatives for Employers*, *Dental Benefits Backgrounder*, *Dental Plan Contract Terminology* and *SCDBI Position on Dental Benefits Plans*.

Committee members are presently looking for opportunities to partner with provincial representatives in organizing meetings. Employer contact meetings will be coordinated by the PMSS department and the Employer Resource Kits have recently been made available to SCDBI members and to CDA's corporate members, who will joint-

ly host the meetings. The materials were developed with provincial input, and the kit allows for the addition of any materials desired by the corporate members, in addition to the core materials developed by CDA. The PMSS department will also monitor feedback from these meetings to ensure that the resource kits are refined for maximum effectiveness. In order to facilitate consistent communications, the resource kit also includes overhead transparencies from which the meeting organizers may choose to augment their presentations.

In April of this year, a new electronic communication tool was introduced to SCDBI members. Although the use of e-mail, faxes and voice-mail systems enable the flow of committee work to be completed in a reasonable time frame, the PMSS department recognized that there were more effective ways to deal with these issues, in terms of both time and cost. An electronic discussion page was created on the World Wide Web to enable all members who are electronically equipped to access information online at any time. The idea is simple. Rather than spending time reading and responding to all committee members' e-mail, reformatting and then reporting these concerns, all committee members are able to

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comment and view each others' ideas. No forwarding of e-mail, no one page faxes that can get lost in the melee of the home or office and most of all, no need to print anything that you do not have to. Initially, the idea required some testing and the use of the system was minimal. However, by the end of April, all committee members were making great use of this system on a weekly, if not daily, basis. The spring SCDBI meeting allowed for a better explanation of the system and after the meeting, the discussion page was very helpful in refining some of the positions advanced at the meeting. CDA staff coordinators have incorporated the discussion page into their daily routine by checking, posting and cleaning the system. The committee on claims management has recently started using their own discussion page to streamline their committee opera-

tions and when the need arises, the two committees can each access the other's web page.

Imagine organizing a meeting at a simple click of a button. Imagine the luxury of an urgent concern being dealt with by a whole committee in under a day, without telephone calls, faxes or being disturbed while providing patient care. The Internet has definitely become an integral part of the operation of the SCDBI. With the advent of new software programs, new committee members and new forums, this tool is certain to be an ever changing system. In fact, by the end of this calendar year, this committee will be launching a new and improved system. Its ability to adapt is perhaps, the most important aspect of this system.

Looking back at the development of the Employers Resource Kit and the amount of work and

effort required over a period of several months and two meetings, we realize now that much of the editorial work could have been accomplished in a very short period of time using the discussion page. In the past, ensuring regional input took a great deal of time, letters, faxes and telephone calls. In the future, such a task could be accomplished on the SCDBI discussion board — all concerns dealt with and a final draft achieved — in only a matter of days. Computer technology has given us new tools to use and CDA is committed to making the most of modern communications vehicles. ■

Dr Burton Conrod is CDA vice-president. He is also past chair of SCDBI.

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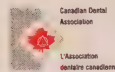
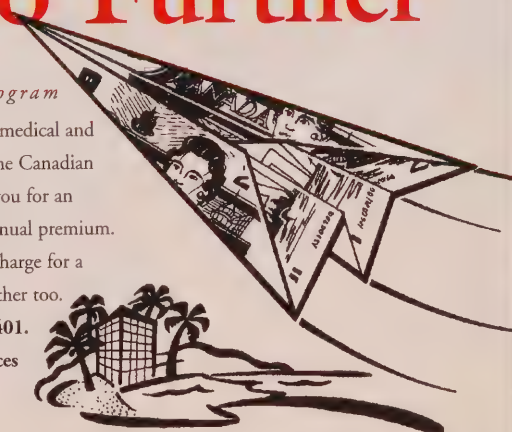
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California
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Barbara Steinberg
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Pennsylvania
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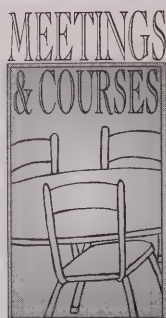
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INTERNATIONAL



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January 16-23, 1999

42nd International Alpine Dental Conference in Courchevel, France. Contact Marie-Ange Vitry, International Dental Foundation, 53 Sloane St., London SW1X 9SW, U.K. Tel.: 44 (0) 171 235-0788; or fax: 44 (0) 171 235-0767.

March 20-27

43rd International Alpine Dental Conference in Courchevel, France. Contact Marie-Ange Vitry, International Dental Foundation, 53 Sloane St., London SW1X 9SW, U.K. Tel.: 44 (0) 171 235-0788; or fax: 44 (0) 171 235-0767.

April 21-24

Irish Dental Association Annual Scientific Conference in Cork City, Ireland. Contact Margaret Ferguson, Irish Dental Association, 10 Richview Office Park, Clonskeagh Road, Dublin 14, Ireland. Tel.: 00353 1 2830499; or fax: 00353 1 2830515.

CANADA



November 13

Building a High Profit Practice and Motivated Team — Total Quality Management in Montreal, Que. Presenter: Dr. R.P. Levin. Contact Ms. Olga Chodan, McGill University, Continuing Dental Education Department. Tel.: (514) 398-7221; or e-mail: chodan@medcor.mcgill.ca

November 21

Clinical Perio Series - #220 - Clinical Periodontics for Dental Teams — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; or fax: (519) 661-3797.

November 25

Toronto Academy of Dentistry — 61st Annual Winter Clinic in Toronto, Ont. Contact the Toronto Academy of Dentistry, 170 Bloor St., W., Suite 902, Toronto, ON M5S 1T9. Tel.: (416) 957-5649; or fax: (416) 967-5081.

December 4-5

Annual Meeting of the Association of Prosthodontists of Canada in association with **The Greater New York Academy of Prosthodontics** in New York, NY. Contact Ms. Jennifer Rogers. Tel.: (905) 305-9373; or fax: (905) 886-8913.

December 5

Prosthodontics Series #2 - Bonded Prostheses — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; or fax: (519) 661-3797.

March 10, 1999

Symposium on Orofacial Pain — From Basic Science To Clinical Management at the Simon Fraser University, in Vancouver, BC. Contact Lucille Gendron by fax:

(514) 343-2233; or e-mail: gendrol@medent.umontreal.ca

U.S.A.



February 3-6, 1999

6th Annual Conference and Exhibition Of the Academy Of Laser Dentistry in Palm Springs, Calif. Contact the Academy Of Laser Dentistry, 10435 Vernon Ave., Huntington Woods, MI 48070-1526. Tel.: (248) 548-7171; fax: (248) 548-7174; or e-mail: acohen@laserdentistry.org

February 11-13

Miami Winter Meeting and Dental Expo in Miami, Fla. Contact the East Coast District Dental Society, 420 S. Dixie Hwy, Suite 2E, Coral Gables, FL 33146-2271. Tel.: 1-800-344-5660; (305) 667-3647; or e-mail: ecdds@ecdental.org

February 5-13

Pennsylvania Academy of General Dentistry's 9th Annual Caribbean Winter Seminar in St. Martin/St. Maarten. Contact Dr. Tom Howley. Tel.: (215) 699-8751; fax: (215) 699-5618; or e-mail: TAOHOLEY@aol.com

February 26-28

Barbados Dental Association's 11th Annual Mid-Winter Convention, in Barbados, W.I. Contact Mrs. Fay Mack, Barbados Dental Association, 17 Pine Rd., Belleville, St. Michael, Barbados, W.I. Tel.: (246) 228-6488; or fax: (246) 228-6488. In Canada, contact Lynne Brandon, tel.: (519) 657-4306 (evenings); or fax: (519) 472-9120; or Mr. Jerry Sheppard tel.: (519) 434-1647 (days); or fax: (519) 434-4936.

DENTAL MEETINGS



January 28-30, 1999

Manitoba Dental Association Annual Meeting in Winnipeg, Man.

Contact Mr. Ross McIntyre, Tel.: (204) 988-5300; or fax: (204) 588-5310.

February 18-20

Pacific Dental Conference At Vancouver in Vancouver, B.C. Contact Ms. Marilynne Webster. Tel.: (604) 714-5303; fax: (604) 736-3645; or Web site: www.pdconf.com

March 26-27

CDA Board Of Governors Interim Meeting in Ottawa, Ont. Contact Ms. Suzanne Burton. Tel.: (613) 523-1770, ext. 2201; or 1-800-267-6354.

April 29 - May 1

Ontario Dental Association 132nd Annual Spring Meeting in Toronto, Ont. Contact Ms. Diana Thorneycroft. Tel.: (416) 922-4162, ext. 346; fax: (416) 922-9005; or e-mail: pdasm@oda.on.ca

May 25-30

93rd Annual General Meeting of the Alberta Dental Association in Jasper, Alta. Contact Dr. E.W. McIntyre. Tel.: (403) 484-1336; or fax: (403) 489-4930.

May 27-29

Prince Edward Island Dental Association Annual Meeting in Woodstock, P.E.I. Tel./Fax: (902) 892-4470.

May 29 - June 2

28e Congrès annuel de l'Ordre des dentistes du Québec in Montreal, Que. Contact Mme Nicole Pagé. Tel.: (514) 875-8511; or fax: (514) 393-9248.

June 4-5

New Brunswick Dental Society Annual Meeting in Saint John, N.B. Contact Mrs. Barb Wishart. Tel.: (506) 452-8575; or fax: (506) 452-1872.

June 19-20

Nova Scotia Dental Association Annual Meeting in Pictou, N.S. Contact Mr. Steve Jennex. Tel.: (902) 420-0088; or fax: (902) 423-6537.

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One of our goals this year is to upgrade the CDA Resource Centre video collection. We will also continue to expand and refine our book collection. If you're interested in a book or video, give us a call or write us an e-mail. You can also look up a title on your own through CDA's Web site. If we don't have what you are looking for, we will try to find it for you.

Networking

The CDA Resource Centre is part of a large information network that includes university and hospital libraries. This allows us to access a wide variety of information and materials for CDA members. If you are looking for information on a non-dental topic, we can use Medline to find appropriate articles and then obtain them for you through an interlibrary loan. We also put you in direct contact with other dental organizations around the world by providing links on CDA's Web site.

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CDA Resource Centre at:

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Journal

October
1998
Vol. 64
No. 9

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unique and dynamic practice. Contact:
Marie Aisthorpe, tel. (403) 640-1422,
(800) 661-1254, voice mail #216, e-mail
craigais@agt.net D341

ALBERTA - Beiseker: \$60,500, 1 operatory
with Pan. Country satellite practice located
45 minutes northeast of Calgary.
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reasonable offer will not be refused.
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1422, (800) 661-1254, voice mail #216,
e-mail craigais@agt.net D342

ALBERTA - Calgary: Downtown, 1,800
sq. ft., three-operatory concept practice
with excellent lease in place. This part-
time practice generating in excess of
\$226,000 has been established 2 years.
Contact: Marie Aisthorpe, tel. (403) 640-
1422, (800) 661-1254, voice mail #216,
e-mail craigais@agt.net D346

ALBERTA - Southwestern: Due to illness,
must sell established rural general
practice in the foothills of the Rocky
Mountains. Beautiful new office built 5
years ago. Will stay on as associate to
smooth transition. Excellent staff,
hygienist, computer system, intraoral
camera. Unbeatable lifestyle - skiing,
watersports - yet 1 hour from the city.
Phone (403) 627-4972, afternoons. D175

ALBERTA - Fort Saskatchewan: Just 15
minutes north of Edmonton. Wonderful
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family oriented city. New office. Excellent
location on main street with high visibility
to traffic. Two operatories, two plumbed.
New equipment and leaseholds including
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ceiling mounted TVs and much more.
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(403) 460-2299, (403) 458-2533,
evenings. D252

BRITISH COLUMBIA - Penticton: Busy
family practice for sale - located in strip
mall in Penticton. Existing dentist would
like to stay on as partner or part-time
associate. Fax (250) 493-1986 or tel.
(250) 493-0020. D353

BRITISH COLUMBIA - Vancouver:
Urban sophisticate wanted for downtown
Vancouver, British Columbia waterfront
dental office. We are a professionally
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allow you to balance family and
professional responsibilities. A second
language (any language) would be an
asset as would a great sense of humour
and good endodontic skills. Please fax
your CV with a covering letter stating
your philosophy and goals to: Dr.
Armstrong, Managing Doctor, Aarm
Dental Group, (604) 683-5468. D331

BRITISH COLUMBIA - Penticton: Busy
family practice located in strip mall in
Penticton, B.C. Existing dentist would like
to stay on as partner or part-time
associate. Fax (250) 493-1986 or tel.
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**BRITISH COLUMBIA - Metropolitan
Vancouver:** Excellent opportunity for one
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BRITISH COLUMBIA - Lower Mainland: Exceptional opportunity to become the owner of an established practice in a growing community in the beautiful Fraser Valley. Vendor willing to stay as needed to ensure a smooth transition. Please reply to: Manfred Purtzki, tel. (250) 754-1951, fax (250) 754-1577. B.C. only, toll free, tel. (888) 668-0629 or toll free fax (800) 665-7211. D244

BRITISH COLUMBIA - Victoria Area: Practice opportunity wanted. Mature dentist desires purchase or partnership in Victoria, B.C., or surrounding communities. All offers will be given serious consideration. Please reply in confidence to: CDA Classified Box # 2720. D045

NEW BRUNSWICK - Saint John: Mature dental practice in midtown Saint John. Two fully equipped operatories, pleasant surroundings, clean building. This is an ideal opportunity for someone who is interested in entering into a practice in the Saint John area. Reason for selling is retirement. For more information, please contact: Bill Tingley, tel. (800) 565-1525 in the Maritimes or tel. (902) 835-1103 locally and outside Nova Scotia and New Brunswick. D286

QUEBEC/ONTARIO - Ottawa-Outaouais: Clinique moderne, en pleine expansion. Propriétaire-associé doit vendre sa pratique. Raison: obligation familiale. Facturation annuelle: 330,000\$ et plus. Possibilité de transition. Communiquez avec Louise au (819) 246-9191, a/s Dr. Lavergne. D354

QUEBEC - Montreal: Dental office space to rent or share with two other dental offices or for an associate. Located just across from the subway-Metro Snowdon. Please call (514) 484-3110 or (514) 488-9648. D352

Positions Available/Sought

ALBERTA - Calgary: Associate wanted for full-scope, active oral and maxillofacial surgery practice in Calgary, Alberta. Candidate must be trained in all aspects of the specialty and eligible for specialty licensure in the province of Alberta. Please send CV to: CDA Classified Box # 2755. D344

ALBERTA - Grande Prairie: Full-time associate required immediately for busy, growing, modern family practice. Open some evenings and weekends; averaging 80+ new patients per month. Position leading to future buy-in. Please call (403) 532-6861 or fax (403) 532-4656. D348

ALBERTA - Calgary: Associate dentist needed for northeast Calgary dental clinic. Please call (403) 276-3660 or fax (403) 276-3881. D338

ALBERTA - Calgary: Dentist with 10 years experience seeking late fall associateship (full time/part time) in Calgary or area. Reply to: PO Box 75009, Cambrian Post Office, 728 Northmount Dr. NW, Calgary, AB T2K 1P0. D326

ALBERTA - Rocky Mountain House: Part-time associate required in the growing central Alberta community of Rocky Mountain House. Expanding solo practice recently built with modern equipment. Applicant should be a highly self-motivated individual. Please call (403) 845-4476 or fax (403) 845-6090. D324

BRITISH COLUMBIA - Central Vancouver Island: Progressive dental practice in Campbell River requires an associate interested in future partnership and eventual buyout later. Campbell River is one of the fastest growing areas in B.C. The outdoor opportunities are unlimited and the quality of life doesn't get any better. We provide high quality dentistry in a new office with six operatories and modern, state-of-the-art equipment in own building in prime location. Experience preferred. Hours negotiable. Please reply to: Fax (250) 923-4093. D347

BRITISH COLUMBIA - Kelowna: Opportunity for associate with a view to purchase. Established, productive practice, great location, new equipment, computerized (Byte). Fun staff and pleasant environment. Tel. (250) 764-8509 (res.); PO Box 29104, Okanagan Mission, Kelowna, BC V1W 4A7 D304

MANITOBA - Swan River: Associate wanted with view to purchase within 1 - 2 years. Well-established, busy general practice in west-central farming community. Five operatories, 4-day work week, long-standing friendly staff. Approximately 30 new patients monthly. Call (204) 734-4756 or (204) 734-2371, after 6 p.m. D288

NORTHWEST TERRITORIES: Canadian-licensed dentists - we have associate opportunities in our Norman Wells and Inuvik clinics and rotational opportunities

with mobile dental teams serving remote aboriginal-based settlements. These are excellent opportunities for motivated, practical-minded dentists with administrative skill and wide ranging operational skill. Please forward your resume and a covering letter to: Box 1360, Inuvik, NT X0E 0T0, or by fax to (867) 777-2774, attention Manager. D340

NORTHWEST TERRITORIES - Yellowknife: Canadian licensed dentists. Full-time associate position available in Yellowknife. Modern, computerized, centrally located clinic. Travel to outlying communities necessary. Exciting opportunity. Forward resume to: PO Box 2615, Yellowknife, NT X1A 2P9 or fax (867) 873-5032. D267

NORTHWEST TERRITORIES - Yellowknife: Canadian certified dental associate required for a modern family dental practice with pleasant support staff. The clinic is located in the city of Yellowknife. Seeking a caring motivated individual interested in a long-term position. Please reply to: CDA Classified Box # 2705. D012

ONTARIO - Northwestern: Full-time associate required. Community offers fishing, canoeing, variety of water activities, golfing, cross-country skiing, or just lounge around town. Tel. (807) 737-8888. D345

ONTARIO - Kanata/Ottawa: Newly established, multidisciplinary office looking for dentist with experience in major restorative and endodontic treatment. Urgently needed for part-time to full-time hours in busy Ottawa area. Reply to: CDA Classified Box # 2756. D349

ONTARIO - Niagara-on-the-Lake: Solo practitioner with successful leading-edge facility in Niagara-on-the-Lake searching for full-time associate, possibly with view to an eventual buy in. Our attractive free-standing building, located on an acre of landscaped grounds, has state-of-the-art equipment and facilities inside. If you are confident, skilled and caring we would like to speak with you. Please call Anne, (905) 468-2128, Monday to Thursday. D336

ONTARIO - Guelph: We are looking for a highly motivated individual for a part-time associateship in our group practice. We anticipate this leading to full time/partnership. This position involves commitment to work evenings and weekends, and a dedication to clinical excellence and comprehensive patient care. Please reply with resume to: Stone Road Dental Office, 435 Stone Rd. W., Ste. L3A, Guelph, ON N1G 2X6; tel. (519) 836-9330, fax (519) 836-1671. D309

ONTARIO - Niagara Region: Associateship wanted. Experienced general dentist available for full-, part-time or locum practice. Please call Geoff Smith, (905) 468-4985. D307

ONTARIO - Ottawa: (1 hour west) Maternity leave replacement required for very busy practice. Four days/week for 6 months starting January 1999. Experience preferred. Part-time associate position available after leave completed. Contact: David, tel. (613) 623-2054 (leave message), fax (613) 623-2058. D313

ONTARIO - Ottawa: Full-time associate needed, with future partnership potential. Days and evenings. High gross practice located in superb, self-standing, brand new facility on major street. Bilingualism an asset. Call (613) 748-8266, fax (613) 745-3305. D235

ONTARIO - Toronto: Cost-sharing opportunity. Looking for dentist with existing patient base who wishes to relocate in downtown Toronto practice. Excellent staff, strong hygiene program. Across from the Faculty of Dentistry. For further information, please contact: Karen, tel. (416) 597-0411. D279

QUEBEC - St. Regis: Full-time dental position available immediately. Dentist required to operate a five-chair clinic in a modern facility. Support services include hygienist, periodontist, endodontist, orthodontist and oral surgeon. We are looking for a conscientious, caring and motivated individual to provide general dental services with a strong emphasis on preventive care. The position is classified english essential. Expression of interest should be directed to: Hilda King, Director, Akwesasne Dental Services, tel. (613) 575-2341, ext. 200. D325

YUKON TERRITORY - Whitehorse: Quality living at it's best. Full-time associate wanted for busy five-operator practice. Fully computerized, pan/ceph and highest quality of care. Newly renovated with an excellent working atmosphere. Enjoy working in a friendly environment while experiencing the beauty of the great north. Please fax or mail resume to: Pine Dental Clinic, 5110 - 5th Ave., Whitehorse, YT Y1A 1L4; fax (867) 668-5121. D330

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SIEMANS CEREC FOR SALE: Two unit, \$100,000, includes training course. Purchased March 1997. Contact: Marie Aisthorpe, tel. (403) 640-1422, (800) 661-1254, voice mail #216, e-mail craigais@agt.net D343

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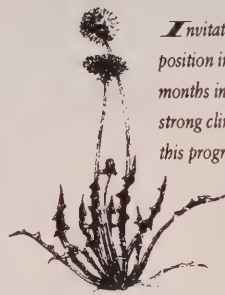
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L2T 2L6 fax: (905) 227-5600
tel: (905) 227-7007 attention: Grace

D351



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D350

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Competition No. K046

Start Date: January 4, 1999

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Applicants must hold a degree from a recognized school of dentistry and be eligible for licensure in the Province of Manitoba. Applicants should have a minimum of three years' current clinical experience; teaching experience would be an asset. The individual must be team oriented with good communication and interpersonal skills.

Affirmative Action is a factor in selection. Applicants are invited to indicate in their covering letter or resume if they are from any of the following groups: women, aboriginal people, visible minorities and persons with disabilities.

Salary will be commensurate with qualifications and experience.

Closing Date: November 6, 1998

Apply in writing to:

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Attention: Human Resource Division
PO Box 3000
The Pas, Manitoba
R9A 1M9
Fax: (204) 623-4414



KEEWATIN
COMMUNITY COLLEGE

D355

Université de Montréal

Professeure ou professeur

en parodontologie ou en pathologie buccale

La Faculté de médecine dentaire recherche deux professeurs au rang d'adjoint ou d'agrégé; les engagements sont projetés pour juin 1999 et juin 2000; cependant, les candidats pourraient se joindre à la Faculté dès janvier 1999. Les deux postes à temps plein ouvrent sur la permanence.

Exigences

Être titulaire d'un D.D.S. (D.M.D.), d'un diplôme de formation spécialisée en parodontologie ou en pathologie buccale et d'un Ph.D. ou, avoir démontré une expérience postdoctorale équivalente; ou être titulaire d'un Ph.D. suivi d'études postdoctorales dans un domaine connexe. Un intérêt pour la biologie moléculaire des tissus durs, la régénération et l'ingénierie tissulaire, la reconstruction au moyen de biomatériaux, les facteurs de croissance, la biologie du développement ou les mécanismes de l'inflammation constitue un atout. La préférence sera accordée aux candidats qui ont déjà un dossier de publication et le potentiel de concourir auprès des grands organismes subventionnaires québécois, canadiens et américains.

Les candidats retenus doivent avoir une connaissance suffisante du français ou s'engager à l'apprendre dès leur nomination. Pour les activités cliniques, les détenteurs d'un D.D.S. (D.M.D.) devront obtenir un permis d'exercice de l'Ordre des dentistes du Québec.

Fonctions

La recherche fondamentale ou appliquée constitue la principale composante de la tâche cependant, les candidats devront participer à l'enseignement fondamental et clinique aux trois cycles universitaires. Les candidats choisis se joindront à des équipes dont les axes grandissants de recherche portent sur les tissus calcifiés, la réparation et la régénération tissulaires, les biomatériaux et l'immunologie des maladies maxillofaciales. Les approches utilisées sont les études in vivo et in vitro, la microscopie électronique, l'immunocytochimie et la biologie moléculaire.

Traitement

Selon les normes de la convention collective en vigueur.

Les candidats intéressés sont priés de faire parvenir leur curriculum vitae, ainsi qu'un bref énoncé de leurs champs d'intérêts, avant le 30 novembre 1998 à :

Mme Monique Michaud, Présidente du Comité de sélection
Faculté de médecine dentaire, Université de Montréal
C.P. 6128, succursale Centre-ville
Montréal PQ H3C 3J7
Téléphone : (514) 343-5844, Télécopieur : (514) 343-2233
Courriel : michaum@medent.umontreal.ca

Conformément aux exigences prescrites en matière d'immigration au Canada, cette annonce s'adresse aux citoyens canadiens et aux résidents permanents. L'Université souscrit à un programme d'accès à l'égalité en emploi pour les femmes.

D356



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For more information contact: Coordinator, Product Recognition Programs, Canadian Dental Association, 1815 Alta Vista Drive, Ottawa, ON K1G 3Y6 (613) 523-1770, 1-800-267-6354, fax: (613) 523-7736



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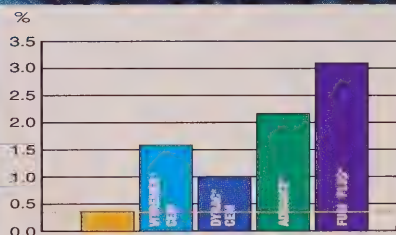
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Comparative Linear Expansion Study of Various Cements after Water Storage., J Dent Res 77 (1998) 689 Abstract 464

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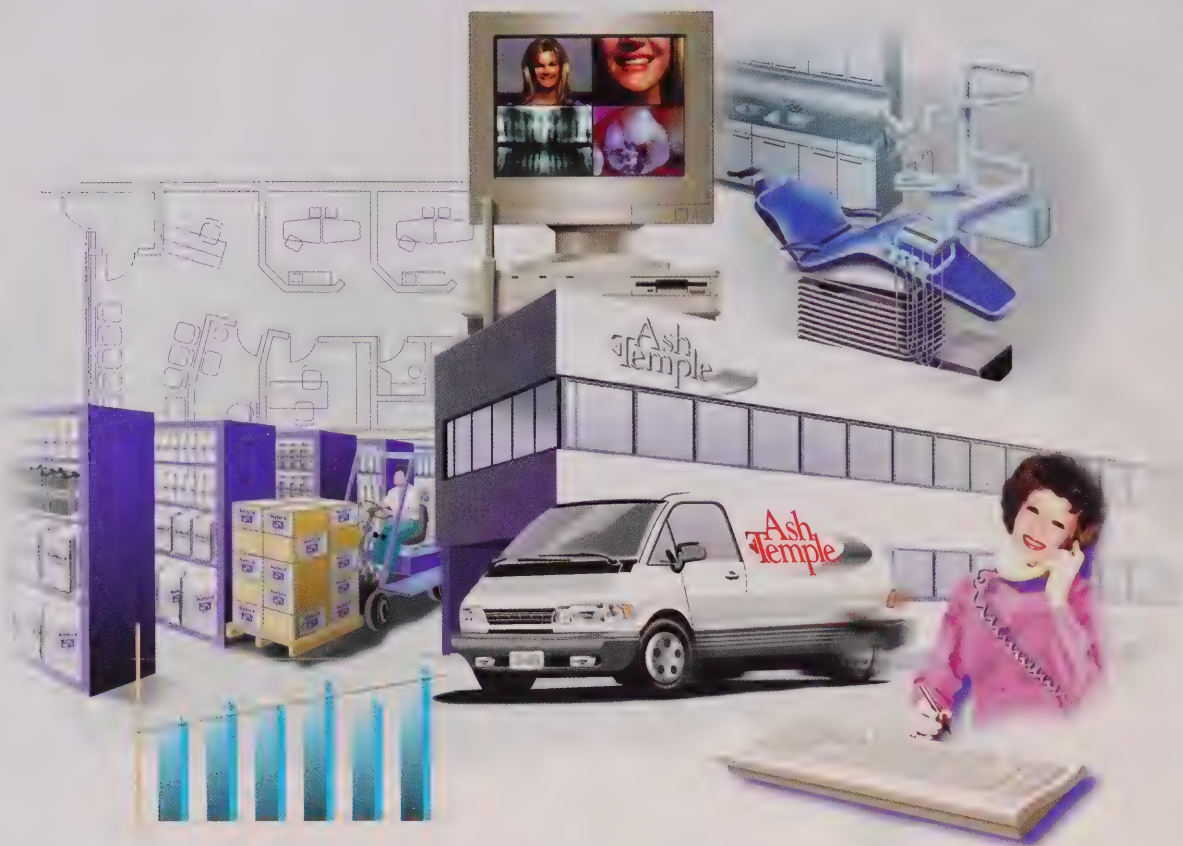
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Canadian Dental Association

NOVEMBER 1998
VOL. 64, No. 10

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The *Journal of the Canadian Dental Association* is published in both official languages — **except scientific articles which are published in the language in which they are received**. Readers may request the *Journal* in the language of their choice.

ISSN 0709 8936
PRINTED IN CANADA



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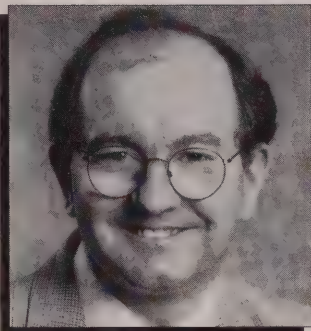
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EDITOR'S NOTES



Dr. John P. O'Keefe

The Importance Of Labels

The publication, in the July/August edition of the *Journal*, of Dr. David Kenny's letter about alternatives to formocresol pulpotomy has certainly provoked an interesting flurry of phone calls and letters. Three letters critical of Dr. Kenny's comments and his response to them are published in this edition (see page 680).

It has been suggested to me that I acted irresponsibly in publishing this letter without subjecting it to peer review. It has also been suggested that, because I was inexperienced as an editor, I was duped into publishing the original letter.

My general response to these comments is that a letter to the editor conveys the opinions of the writer and is not the holy writ of CDA. The letters and debates sections of the *Journal* carry clear labels indicating that the contents are opinions — nothing more. I really believe that such opinion pieces are vital to the future of this publication because they have the potential to bring new and fresh ideas to the attention of the profession.

I know it takes an awful lot of courage to sign your name to a letter to the editor. Therefore, I want to encourage letters and opinion pieces that are pertinent to the practice of dentistry, are dignified

in tone, and do not contravene the law of the land. There are some letters that should be accompanied by a response on the same page. I believe that this is preferable to suppressing the opinions of iconoclasts. Galileo got himself into a lot of hot water for claiming that the earth was not the centre of the universe. The Inquisition got that one wrong.

We also clearly label articles that have been peer reviewed. That label indicates that the information conveyed in the article has been validated by experts (preferably two). My promise to you is that I will do everything I can to ensure that opinion does not masquerade as science in the *Journal*.

The Electronic Journal

We are continuing to develop the electronic version of the *Journal* (let's call it eJCDA). The eJCDA editions for September, October and November were available on the CDA Web site over two weeks before the print version arrived in your offices. The electronic medium certainly creates the potential for transferring information from my desk to yours (and vice versa) at high speed.

Since September we have been conducting an experiment with the eJCDA. As soon as an edition of the *Journal* is ready to go to the printer, I send out an e-mail message that has a list of "hot links" to the clinical articles in the eJCDA. When you open the e-mail message, you can go directly to the full text of any article that interests you by pointing your cursor and clicking your mouse button.

Besides the *Journal*, CDA can send you other time-sensitive information if we have your e-mail address. Recently, the President sent, by e-mail, a letter about the NIHB dental program to the 900 dentists for whom we have an electronic address. My guess is that many thousands of Canadian dentists have access to e-mail and the Internet, at home or in the

office. If you want to join CDA on the information superhighway, please send your e-mail address to reception@cda-adc.ca.

Writing and Reviewing

CDA and the Association of Canadian Faculties of Dentistry (ACFD) will be hosting a one-day workshop entitled "Preparing and Evaluating Manuscripts for Clinical Journals" on March 10, 1999. The workshop will take place in Vancouver in conjunction with the annual meeting of the American Association of Dental Schools.

The facilitator of the workshop will be Dr. Bruce Squires, former editor of the *Canadian Medical Association Journal*. There will be a strong practical component to the workshop with manuscripts submitted to the *Journal of the Canadian Dental Association* serving as resource material for participants.

A Special Thanks

This past summer, there were a number of staff changes in the publications division at CDA. Four staff members went on to other career opportunities. The upshot of these changes was that a small number of dedicated staff members took on a whole lot of extra work for a number of months. Even though our publications have been arriving in your offices a bit later than we desire, these staff members worked very hard just to "keep the show on the road."

I would like to take this opportunity to publicly thank Rachel Galipeau, JoAnne Sim, Nathalie Upton and Teresa Amoroso for their efforts over the scorching summer of 1998. Thankfully, we are back to our staff complement again. This summer's upheaval has slowed up the implementation of some changes we have been planning for the *Journal*. Hopefully, we are back on track again.

John O'Keefe
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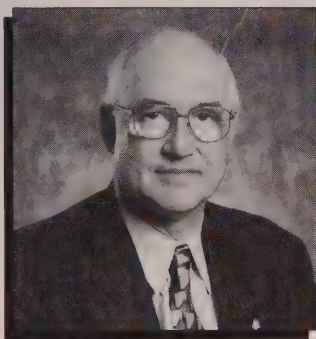
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PRESIDENT'S COLUMN

GETTING IT STRAIGHT



Dr. Richard Sandilands

Membership in the CDA, voluntary or otherwise, is an ongoing issue, and one which, quite frankly, takes up a lot of the time and energy of the administration and elected persons within the organization. At first glance, the issue seems fairly straightforward — if you are eligible to join on a voluntary basis, you either pay your annual fee or you simply don't receive any benefits of membership. Membership in CDA also exists at the corporate level, where each provincial dental association pays a fee based on how many members it has.

Individual members complain that they are paying too much for the privilege of supporting non-members. As for corporate members, they have recently expressed concerns about the increases in corporate fees, with some going as far as not paying the increases at all. One might ask, "What's wrong with this picture?" The problem is not solely "about the money." The real issue as I see it, is one of vision for the future, and it goes to the very heart of what a national organization such as the CDA represents.

It is easy enough for members to be angry and frustrated because dentists who are not members reap some of the same benefits as

they do. It is easy enough for a corporate member to state that no further increases will be paid to the national organization. What is not so straightforward is assessing which of the current services that CDA provides will need to be reduced or eliminated, given the possibility of decreased revenues. There is no easy answer to this dilemma, as evidenced by the similar problems facing other national organizations. While national associations such as the CDA would benefit greatly from the total participation of all eligible members, it appears that this scenario is simply not going to materialize. The best way to deal with the situation then, is to provide or enhance services to members, and ensure that these services are simply not made available to non-members.

Some benefits of CDA membership, such as the *Journal*, are provided to all dentists in Canada. Others, like *Communiqué*, are provided to members only. There are members who question this practice, and perhaps they have some basis for doing so. The reality is, however, that a large percentage of your membership fee helps provide services exclusively to CDA members. Special membership campaigns designed to attract new dentists are conducted every year, including programs targeted to students in every dental school across this country. Our challenge is to appeal to these new graduates in a way that meets their needs. It is naive to think that the problem of membership is limited to those provinces that are labelled as "individual voluntary," since questions regarding the necessity of membership in CDA are part of the ongoing debate all over the country.

There are some possible solutions that make sense to me, such as the possibility of cost sharing membership programs with the provincial corporate bodies, and other partnering ventures. This shared responsibility would help to control program costs within

CDA and increase the efficacy of member services within organized dentistry.

Without a national voice, dental professionals across this country would be at a significant disadvantage with government and in danger of being elbowed aside by private self-interested corporations. Without a strong national association in Canada today, we are increasingly at risk of not being heard. As dental professionals, we are fortunate to be among the most respected of professional groups as well as among the best trained professionals. And we are currently the best represented profession anywhere in the world. While the issue of membership is not yet resolved to the satisfaction of all concerned, CDA is continuing to seek new alternatives that will satisfy individual and corporate concerns.

I believe that each dental professional in Canada has a responsibility to support organized dentistry, not only at the local and provincial levels, but at the national level as well. However trite this may sound, in the next decade organized dentistry will either survive because it is represented by a strong, united national association, or it will be absorbed by the combined collective self-interest of government legislators and private-sector groups, as has happened to other related health care professions. In order to survive, we will need to demand a great deal of our professional leadership at all levels, as well as rely upon that same leadership to produce the best possible results.

I would like to think that I have it straight. What do you think? Membership in CDA is an individual commitment to the national organization. What ideas do you have that would reward individual members who have made this commitment? You can e-mail me your ideas and suggestions at: reception@cda-adc.ca.

Richard Sandilands, DDS
President of the Canadian Dental Association

Journal

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1998
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No. 10



Editor's Comment

The Journal welcomes letters from readers about topics that are relevant to the dental profession. The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the Canadian Dental Association. Letters should ideally be no longer than 300 words. If what you want to say can't fit into 300 words, please consider writing a piece for our "Debate" feature.

The Continuing Epidemic

There are a number of peculiarities in the recent article by Epstein J.B. et al. ("The Continuing Epidemic of HIV and AIDS in 1998" *J Can Dent Assoc* 1998; 64:426-30) which should be brought to the attention of *Journal* readers.

1. The authors indicate that Tables I and II relate to patterns of HIV infection; however, both tables are not concerned with HIV but with the number of AIDS cases.
2. According to the text, the number of cases of HIV seropositivity identified in Canada during the last 10 years has remained remarkably constant at approximately 3,000 cases per year. If HIV is the cause of AIDS, these figures do not support the presence of an epidemic, but rather indicate that the level of the condition is remaining stable among those "at risk" individuals.
3. According to Table I, the total number of AIDS cases in Canada in 1995 and 1996 was 1,392 and 717 respectively. The dramatic decline in one year

hardly supports a continuing epidemic. The Canadian reporting system is such that not all of the 1996 cases are included in the 717 total, and will not be for some time. Attempting to make predictions with less than complete information is an exercise fraught with danger.

4. Table III refers to the exposure categories of U.S. and San Francisco AIDS cases. The U.S. figures are separated by sex, but the San Francisco figures are not. Therefore, there is a peculiar list titled M and F which includes men who have sex with men, and lesbians and bisexual intravenous drug users. Surely, the authors should have separated this list by sex.
5. The authors suggest, and indeed appear to be emphasizing, "an increase in the incidence of infection in heterosexual individuals." However, if the AIDS numbers for Canada are analyzed between 1988 and 1995, when an average of 1,457 adult cases were reported each year, the following trends are noted:

- among men who have sex with men, a gradual decline in the percentage from a high of 83.8% of the total in 1988 to 72.5% of the total in 1995;
- among injection drug users (male and female), a gradual increase in the percentage from a low of 1.4% in 1988 to a high of 7.6% in 1995;
- among males and females having sexual contact with individuals at risk, a gradual increase in percentage from a low of 3.9% in 1988 to a high of 8.3% in 1995;
- among males and females having sexual contact with individuals in countries with a predominantly heterosexual distribution of AIDS, a remarkably minor increase in percentage from

a low of 3.5% in 1988 to a high of 4.3% in 1995.

These trends over an eight-year period demonstrate that AIDS has remained within clearly defined high-risk groups and is not affecting heterosexuals who are not at risk. If this were occurring, there would be a dramatic increase in the number of yearly HIV cases, which the authors admit is not happening.

Finally, readers should be aware that figures recently published by the U.S. Centers for Disease Control for the year ending in 1997 show that HIV/AIDS diagnoses declined from 68,808 in 1996 to 60,634 in 1997. Heterosexual contact cases declined from 9,526 in 1996 to 8,112 in 1997. In 1996, heterosexual cases represented 14% of the total and 13% in 1997. Female adult diagnoses declined from 13,767 to 13,105.

These figures and the trends noted above do not support a "continuing epidemic" but do confirm that AIDS has remained confined to established risk groups and is not spreading to the vast majority of North American heterosexuals who do not indulge in "at risk" behaviour. Considering the generally depressing information which accompanies AIDS cures and vaccines, this good news deserves wide distribution to readers and their patients.

John Hardie, BDS, M.Sc., PhD,
FRCD(C)
Riyadh, Saudi Arabia

Response From Dr. Epstein

The letter to the editor from Dr. J. Hardie regarding my article appears to question the title of the paper. The intent of the paper was to review the progress of the epidemic. The overall statistics of HIV/AIDS in the previous 10 years met the strict definition of an epidemic, with logarithmic growth in the number of cases. Epidemics typically behave in the manner HIV/AIDS has developed in North America. There is an initial slow increase in cases, then a

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logarithmic growth in cases in risk groups, followed by a stabilization of growth in the number of cases. This pattern is typical of other epidemics and has been seen in HIV/AIDS. Indeed, it is referred to within the text of the article, which Dr. Hardie appears not to have identified in his letter. In this regard, the article presents a similar discussion of data as presented in Dr. Hardie's letter. However, there are certain high-risk groups in which a logarithmic growth in the number of new cases is occurring, including injection drug users, and this may be beginning in heterosexual cases as well. Dr. Hardie attempts to diminish the importance of current data on heterosexual cases. Yet there is strong evidence of an increase in infection in females and heterosexuals. Also, there is evidence that individuals entering adult years may be involved in high-risk behaviour that may place them at similar risk as in the earlier years of the epidemic, which suggests that new cases in such young adults will increase in an epidemic manner unless risk behaviour is modified.

When cumulative cases of AIDS are tallied, changes in the epidemic can be more difficult to identify. Even so, and according to Dr. Hardie's average calculations, an increase in heterosexual cases has been identified, and when newly reported cases are reviewed, the ratio of cases in females has been increasing.

The data on HIV seropositivity in Canada are available due to the central reporting of blood serology. These data may provide guidance as to the future health care needs related to HIV. These data are described in the paper, and show an increase in HIV seropositivity in females from 9.5% prior to 1995 to 18.9% in 1996.

Dr. Hardie suggests that Health Canada data are incomplete. The data presented on HIV/AIDS cases in Canada are Health Canada statistics that are compiled using similar methodology for the number of cases each year. The most recent annual data made available through Health Canada at the time of preparation of the paper was 1996.

Dr. Hardie also alludes to the causation of AIDS, where the evidence of direct relation to HIV is extremely strong. The article focuses on the changes that have occurred in HIV/AIDS due to current drug therapy, and attempts to address the question of the possible future of HIV/AIDS and oral care issues in North America. We agree that the evidence of transmission related to risk behaviour (sexual transmission and exposure to blood and blood products), as with other sexually transmitted diseases, will not lead to a widespread pandemic and that behavioural factors are the key risk. The long-term result will likely be an endemic infection in the population at large, although individuals with the identified high-risk behaviours will remain at increased risk.

The impact of improved control of HIV-related disease will lead to increased numbers of individuals in society living with chronic immunosuppression. The future of the disease in society may be an increased number of individuals with common oral manifestations of immunosuppression if resistance to HIV develops to current therapy and disease progression. These conditions were previously reported in larger numbers of patients prior to the use of new medications for HIV. Oral health care workers should remain informed and up to date about HIV and AIDS.

We agree with Dr. Hardie that one of the "good news" regarding HIV/AIDS is that risk behaviour is the primary determinant of infection risk.

Joel B. Epstein, DMD, MSD
Vancouver, BC

Formocresol In Primary Teeth

In the July/August issue of the *Journal*, you published a letter from Dr. David Kenny which informed dentists in Canada that the Royal College of Dental Surgeons of Ontario (RCDSO) has determined that paraformaldehyde-containing materials were no longer considered an acceptable standard of

care for the treatment of endodontically involved teeth. From this statement, Dr. Kenny inferred that this policy also applied to the use of formaldehyde-containing medicaments in the provision of vital pulp therapy in primary teeth. He then went on to describe one accepted treatment alternative, the non-formaldehyde vital pulpectomy/Zing-Oxide-Eugenol primary root canal treatment and one alternative, ferric sulfate, recently approved for clinical research use at the Hospital for Sick Children for its investigation as a vital pulpotomy agent.

We feel we must clarify this issue for the Canadian dental community. The RCDSO statement only applied to the use of paraformaldehyde products used in the endodontic treatment of permanent teeth in adults. There was no inference as to the use of formaldehyde-containing products in primary teeth as a vital pulp therapy agent. For your information, the RCDSO is about to publish a follow-up note to all dentists registered with the College that the statement did not apply to formocresol in primary teeth and that the formocresol pulpotomy is still considered an acceptable standard of care for primary tooth vital pulpotomy.

All dentists who treat children should be assured that the formocresol vital pulpotomy (one-fifth dilution or full strength) is still the gold standard of care for primary tooth vital pulp therapy in Canada, and is taught as the principal primary tooth vital pulp therapy agent at the majority of North American dental schools.

The Department of Pediatric Dentistry at the University of Toronto will continue to teach the formocresol vital pulpotomy technique as the principal form of primary tooth vital pulp therapy until such time as an alternative agent is discovered that demonstrates the same or superior success to formocresol. Let it be known that we would readily accept a non-formaldehyde-containing medication with a record of success equal to formocresol. However, at this

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time it is difficult to argue with the high, long-term success rate of formocresol and the lack of reported negative effects. Therefore, we shall continue to teach and use formocresol as a vital pulpotomy agent in our educational clinical programmes. It is our hope that this information will be made available to the Canadian dental community in the near future.

Michael J. Sigal, DDS, M.Sc., Dip. Paed., FRCD(C)
Professor and Head, Pediatric Dentistry

Keith Titley, BDS, LDS, RCS, M.Sc.D., Dip. Paed., FRCD(C)
Professor, Pediatric Dentistry
Franklin Pulver, DDS, M.Sc., FRCD(C)

Assistant professor, Pediatric Dentistry
Paul Andrews, B.Sc., DDS, M.Sc., Dip. Paed.
Assistant professor, Pediatric Dentistry
Norman Levine, B.A., DDS, FRCD(C)
Professor, Pediatric Dentistry
University of Toronto
Toronto, Ont.

I note the publication in the July/August issue of the *Journal* of a letter to the editor from Dr. David Kenny regarding the use of formocresol in pediatric pulp therapy. The primary thrust of this letter appears to centre on the fact that the Royal College of Dental Surgeons of Ontario (RCDSO) "has determined that the use of paraformaldehyde-containing paste or material in endodontic therapy is not a standard of practice in this province [Ontario] and, therefore, such material should not be used". Neither the RCDSO nor Dr. Kenny has provided scientific evidence that formocresol is in fact a harmful substance when it is used in pediatric pulp therapy techniques according to the guidelines of the American Academy of Pediatric Dentistry, the pre-eminent pediatric dental organization in the world. In fact, there are no human studies which have determined that formocresol is a harmful substance. There are, however, numerous scientific articles in the pediatric dental literature which have shown that pulpotomies in primary teeth, which have been completed using a dilute form of

formocresol, are successful clinically and radiographically and provide a valuable service to those children in need.

Dr. Kenny's letter reminds me of the story about "Chicken Little," who thought the sky was falling. The concerns he expresses about toxicity, mutagenicity and carcinogenicity have arisen from several review articles, one of which Dr. Kenny has cited. However, none of these reviews have cited literature which documents that formocresol is a harmful substance when used as recommended.

The RCDSO may pronounce whatever statements it chooses, as may Dr. Kenny. However, dentistry must have a scientific foundation and, I repeat, neither Dr. Kenny nor the RCDSO has provided sound scientific evidence that formocresol is, in fact, harmful to children when used as recommended. It is presumptuous of Dr. Kenny to suggest that other dental jurisdictions in Canada should take heed of the RCDSO position, baseless as it is, just as it is presumptuous of him to suggest, in the absence of any human scientific evidence, that dentists should stop using a recognized and safe procedure and material. His argument reminds me of the amalgam vortex which has engulfed dentistry lately, a debate which has also been shown to be largely groundless.

Canadian dentistry rests on a foundation of scientific evidence determined from both basic science and clinical investigations. I believe that CDA has done Canadian dentistry and the public we serve a disservice by publishing Dr. Kenny's letter. In future, I strongly recommend that letters which express personal opinion, such as Dr. Kenny's, be reviewed by experts in the respective field before publication to ensure that the information contained within is scientifically valid.

Alan Milnes, DDS, Dip. Paed., FRCD(C), FICD
Kelowna, BC

Both the American Academy of Pediatric Dentistry (AAPD) and the Canadian Academy of Pediatric Dentistry (CAPD) utilize the "Guidelines for Treatment as Out-

lined in the AAPD Reference Manual." The guidelines for pulp therapy for primary and young permanent teeth as developed by the AAPD are not intended to delineate chemicals or procedures for pulp treatment. Further, the "pulpotomy procedure is indicated in primary teeth when the infected coronal tissue can be amputated and the remaining radicular tissue is judged to be vital, or affected but still vital by clinical and radiographic criteria."

"A pulpectomy is indicated in primary teeth with carious pulp exposures in which the radicular pulp exhibits signs of hyperemia, such as excessive hemorrhage or in cases where there is evidence of radicular pulp necrosis with or without caries involvement."

Thus the routine performance of a zinc oxide eugenol pulpectomy as practised by Dr. Kenny in place of a vital pulpotomy technique such as formocresol is nothing but his personal preference. The formocresol pulpotomy is still considered an accepted standard of care for the primary tooth vital pulpotomy, both in Canada and the United States.

Dr. Kenny's search for an alternative agent for pulpotomies using ferric sulphate is part of the continuing clinical research in the pursuit of other techniques that one day may be another scientifically accepted standard of care judged by established criteria.

The CAPD supports the guidelines and endorses its affiliation with the AAPD, and includes all the provinces and territories of Canada in its Constitution and By-laws.

Dr. Robert Barsky, FRCD(C)
President, CAPD

Dr. Ross Anderson, MRCD(C)
Vice-president, CAPD

Dr. Alan Milnes, FRCD(C)
Secretary/Tres. CAPD

Dr. Vic Legault, FRCD(C)
Executive Director, CAPD

Dr. Kenny's Response

My letter was intended to inform Canadian dentists of an apparent new standard of practice in Ontario. Health care is a provincial

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matter and, in Ontario, a new standard of practice by the Royal College of Dental Surgeons of Ontario (RCDSO) takes precedence over the guidelines of any specialty group. I have since been informed that the RCDSO only meant to ban the use of paraformaldehyde compounds in adults. The College is about to release a clarification of their April statement indicating that the use of formaldehyde is still acceptable for children.

I disagree with Dr. Milnes's interpretation of the literature. Both formaldehyde and glutaraldehyde have been shown to pass from the tooth into the vasculature system of dogs. Formaldehyde has been shown to be a mutagen in animals and humans. Formaldehyde denatures protein and can produce immune sensitivities. Based on this evidence, I decided to eliminate the use of aldehydes for children treated at The Hospital for Sick Children. We developed the zinc oxide-eugenol root canal treatment for vital pulp exposures in primary teeth at this hospital and published it in two peer-reviewed journals. We have already begun the first Canadian randomized outcome study of another aldehyde-free technique, the ferric sulfate pulpotomy.

I understand that the RCDSO does not have jurisdiction outside of Ontario and I have not attempted to tell any Canadian dentist how to run his or her practice. However, I do hope they will personally consider eliminating the use of aldehydes in children.

David J. Kenny, B.Sc., DDS, PhD
Director of Dental Research and Graduate Studies
The Hospital for Sick Children
Professor of Dentistry
University of Toronto

Bilingual Journal, Bilingual Ads?

I am very aware of your efforts to publish a top-quality journal, and am writing to you today, not as a director of the ACDQ or CDA, but simply as a dentist.

Some years ago, the CDA decided to produce a French ver-

sion of its journal in addition to the English version. We are all aware of your efforts to fulfil this mandate since your arrival at the CDA as editor of the *Journal*.

I have stated on numerous occasions that francophone dentists would prefer reading recent scientific articles in English rather than having to wait a long time for the French translation. For some time now, all articles written by CDA authors have been published in French. The cover of the September issue even features the work of an eminent Quebec dentist, Dr. Pierre-Yves Lamarche. To me, this is quite an accomplishment.

The problem is with the advertising. I am speaking to the advertisers here, not you, but would like you to pass along a very clear message. On several occasions, CDA has provided technical or financial support for translating advertisements. Some advertisers complied with your requests, while others ignored them until they realized the importance of such an initiative.

Unfortunately, some advertisers continue to be stubborn, publishing their advertisements in English only. I am referring specifically to the Premier, Sonicare, Ivoclar and Astraen ads in the September issue. These companies may have a limited francophone market, but anyone with even the faintest understanding of marketing knows that for an advertising strategy to be effective, it must be understood by its target audience. If people reading these advertisements are indifferent to them or, worse yet, offended by their content, how can those advertisements be effective? The less people read the advertisements, the less inclined they will be to buy the product and, vice versa, the less often they buy the product, the less attention they will pay to the advertisements.

Finally, it is an insult on the part of an advertiser such as Oral-B (without a doubt one of the largest sellers of toothbrushes to Quebec dental offices) to publish, in the centre spread of the September issue, an advertisement

that is half French, half English. To add insult to injury, it is like telling me that, on the one hand, we want to sell you an electric toothbrush, but on the other, we're ignoring you because the toothbrush is made only for those who understand English!

Saying that they do not have the technical or financial means to translate their advertisements is no excuse, because some advertisers occasionally publish advertisements in French in the journal of the Ordre des dentistes du Québec. In my opinion, they must understand the need to address their customers in their respective languages.

In closing, I would like to thank you for your attention to this matter.

Louis Dubé, DMD
Sherbrooke, Que.

Editor's comment

I sympathize with the frustrations expressed by Dr. Dubé. The *Journal* and our advertising sales representatives are working closely with advertisers to encourage them to provide us with French advertising film for the French edition of the *Journal*. We want to make it easy for advertisers to get their messages to francophone dentists in their own language.

Suggested Topics For the Journal and Communiqué

You ask what issues should be dealt with in CDA publications. Here are some of my suggestions.

Clinical topics: esthetics, air abrasion, non-metallic restorative techniques, implant systems and techniques, Empress, Procera, Targis Vectris, flowable composites, posterior composites, and the legitimacy/non-legitimacy of new materials and techniques.

Political topics: treatment by parentals and non-dental personnel, dental manpower increasingly outstripping demand, deteriorating levels of treatment for natives and of social services for our most disadvantaged patients, quality assurance programs, published practice

Continued on page 750

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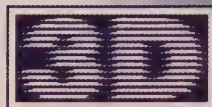


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1. Cronin M, et al. A 3-month clinical investigation comparing the safety and efficacy of a novel electric toothbrush (Braun Oral-B 3D Plaque Remover) with a manual toothbrush. *Am J Dent* 1998; in press. 2. van der Weijden GA, et al. A comparison of the efficacy of a novel electric toothbrush and a manual toothbrush in the treatment of gingivitis. *Am J Dent* 1998; in press. 3. Sharma NC, et al. A comparison of two electric toothbrushes with respect to plaque removal and subject preference. *Am J Dent* 1998; in press. 4. Cronin M, et al. Cleaning efficacy of a new electric toothbrush. *Am J Dent* 1998; in press. 5. Ernst CP, et al. Clinical plaque removing efficacy of a new power toothbrush. *Am J Dent* 1998; in press. Braun and Oral-B are registered trademarks of Braun AG and Oral-B Laboratories, respectively. Optima is a registered trademark of Optima Corp.



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The SLSA Program is published as a monthly feature in the *Journal of the Canadian Dental Association* as a resource for dentists. For further information see the September 1998 issue of the *Journal*.

QUESTION 6

When restoring a tooth with composite resin where caries has extended close to the pulp, which of the following is/are acceptable?

1. Glass ionomer cement as a base
2. Calcium hydroxide as a liner
3. A resin bonding agent to form a "hybrid layer"
4. Varnish as a liner

A. 1, 2, 3 B. 1 and 3 C. 2 and 4
D. 4 only E. All of the above

ANSWER: B

RATIONALE:

Varnishes and liners have long been used to protect the pulp from thermal trauma and to minimize microleakage. Pashley has shown that varnishes and liners have little effect on reducing dentin permeability. Neither varnish nor calcium hydroxide can seal cut dentin against leakage of dentinal fluid and, when a restoration is subjected to thermal change, fluid exchange in the tubules results in pain. Adhesive bonding systems which create a "hybrid layer" or glass ionomer bonded base materials both counter the above phenomenon.

Two schools of thought presently exist in the use of glass ionomer cements or dentinal bonding agents as bases in deep cavities. Supporters of glass ionomer cements argue that the cements readily bond to dentin since they are water based materials and are thus unaffected by dentinal fluids exuding from dentin as they set. After etching glass ionomer cement, composite resins adhere readily to the etched ionomer cement surface. Glass ionomer cements, however, exhibit lower tensile and bond strengths when compared to resin bonding agents.

The advocates of dentin bonding agents recommend the exclusive use of photocured resin bonding materials. These form a "hybrid layer" in the dentinal surface which is impervious and which provides a high bond strength. Because of this quality, bonding agents are recommended for the bonding of composites, porcelain veneers, inlays and some metal restorations to tooth structure. However, it must be noted that the preparation of tooth surfaces for bonding agents requires more attention to detail than when glass ionomer cements are used, i.e., they are more technique sensitive.

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2. Cronin, R.J., Cagna, D.R. An update on fixed prosthodontics. *JADA* 128:425-436, 1997.
3. Leinfelder, K.F. Changing restorative traditions: the use of bases and liners. *JADA* 125:65-67, 1994.
4. Cox C., Suzuki, S., Re-evaluating pulp protection: calcium hydroxide liners vs. Cohesive hybridization. *JADA* 125:823-831, 1994.

QUESTION 7

When using dental sealants, you would

1. choose a chemically activated resin because it is superior to a light activated one.
 2. apply only on permanent teeth.
 3. avoid application to the adult dentition.
 4. place primarily in pits and fissures.
 5. apply a 37% phosphoric acid etchant for 15 seconds.
- A. 1, 2, 5 B. 1, 3, 5 C. 1, 4, 5 D. 4 and 5

ANSWER: D

RATIONALE:

A recent American Dental Association report¹ has endorsed several important findings related to the use of dental sealants. No clinical difference in terms of efficacy of chemically activated resins is shown over light activated systems. The use of sealants is usually advocated for children, with highest priority for placement on first and second permanent molar teeth when indications of high caries risk exist. Sealants may, however, benefit adult as well as primary dentitions. The report further suggests that even smooth surfaces may benefit when high caries risk is suspected.

Caries causing bacteria when trapped under intact resin fail to regenerate and enamel lesions do not progress. A contraindication to the use of dental sealants would appear to relate to an allergic reaction to the resin, but this is a RARE finding.²

Bisphenol-A or BPA is a component of composite resins and fissure sealants. Some concern was expressed when a 1996 study reported the release of BPA into the saliva of patients who had had sealants applied to their teeth. The concern relates to the fact that BPA as a xenobiotic has been shown to exhibit xenoestrogenic behaviour with the potential to affect the production, metabolism and activity of estrogens.

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A more recent review², however concludes that until such time as a co-relation is demonstrated between detectable BPA in saliva and xenoestrogenic effects in vivo there is no reason to change the indications for use of sealants clinically.

It must be noted³ that acid conditioning of enamel with 37% phosphoric acid produced the highest bond strengths of sealant to enamel when compared to an enamel surface conditioned with 2.5% nitric acid or air abrasion with sodium bicarbonate or aluminum oxide. It would appear that 15 seconds of conditioning with 37% phosphoric acid provides the best clinical result.

REFERENCES:

1. Association Report - Dental Sealants *JADA* 128:485-488, 1997.
2. Stanley, H.R., Local and systemic responses to dental composites and glass ionomer. *Adv Dent Res* 6:55-64, 1992.
3. Brown, J.R., Barkmeier, W.W. A comparison of six enamel treatment procedures for sealant bonding. *Pediatric Dent* 18:29-31, 1996.
4. Olea, N., Pulgar, R., Perez, P., et al. Estrogenicity of resin based composites and sealants used in dentistry. *Environ. Health Perspect.* 104:298-305, 1996.
5. Ruse, N.D., Xenoestrogenicity and dental materials, *J Can Dent Assoc* 63:833-836, 1997.

QUESTION 8

Retrograde periodontitis is a condition with all the basic characteristics of periodontal disease.

The loss of attachment produced by retrograde periodontitis is reversible.

- A. The first statement is true, the second is false.
- B. The second statement is true, the first is false.
- C. Both statements are true.
- D. Both statements are false.

ANSWER: B

RATIONALE:

Retrograde periodontitis is a term related to a periodontal lesion which progresses in the opposite direction to that experienced in marginal periodontitis. It has none of the basic characteristics of periodontal disease, resulting in no permanent damage to the cementum or the periodontal fibres. The loss of attachment produced by such lesions can be completely reversible through endodontic therapy alone since the etiology relates to pulpal disease.

Pulpal disease can be both acute and chronic. In the chronic state, degeneration of the tissue occurs. Pulpal inflammation is accompanied by increased intrapulpal pressure, as a result of which toxic agents can be expressed through the apex as well as by lateral and accessory canals into the adjacent periodontium. From here, tracking along the ligament can occur to form a fistula which, by penetrating the gingival sulcus, causes a pseudo-periodontal pocket simulating periodontal disease and termed retrograde periodontitis.

The diagnosis of pulpal periodontal lesions may be simple, especially when an adequate long term history of the patient is available. However, it can be difficult in multi-rooted teeth, where pulp testing might give a vital response despite complete necrosis in one or more canals.

The non-vital endodontically treated tooth with the combined lesion presents an even greater problem. Careful probing of the lesion will usually provide information regarding the progression of periodontal disease. The periodontal lesion will usually be broader at the point of origin and calculus or root roughness will be detected. Additionally, signs of marginal periodontitis will be evident elsewhere. When a definitive diagnosis cannot be made, it is prudent to initiate endodontic therapy and, after instrumentation, place calcium hydroxide as an intracanal medicament and then OBSERVE.

REFERENCES:

1. Solomon, C., Chalfin H., and Kallert, M. et al. The Endodontic-Periodontal lesion: A rational approach to treatment. *JADA* 126:473-479, 1996.
2. Paul, B.F., and Hutter, J.W. The endodontic-periodontal continuum revisited: New insights into etiology, diagnosis and treatment. *JADA* 128:1541-1547, 1997.

QUESTION 9

Which of the following oral conditions most frequently becomes malignant?

- A. Lichen planus
- B. Irritational keratosis
- C. Nicotinic stomatitis
- D. Leukoplakia
- E. Leukedema

ANSWER: D

RATIONALE:

The World Health Organisation defines leukoplakia as a keratotic white plaque. It is a clinical entity diagnosed not so much by defining appearance as by exclusion of other lesions. Of the above, it is the most common premalignant oral lesion. Leukoplakia is found in 3 percent of white adults. Conservative surgical excision is the preferred treatment with biopsy and follow-up for 3 years.

The results of several studies indicate a risk of associated malignancy in patients with oral lichen planus, particularly in the erosive form and in erythematous areas.

Although there is a relationship between smoking and squamous cell carcinoma of the oral cavity, nicotinic stomatitis has not been shown to undergo malignant transformation.

Irritational keratosis in a healthy mouth does not undergo malignant change.

Leukedema is an abnormality occurring bilaterally on the buccal mucosa which clinically resembles early leukoplakia. Leukedema appears to be simply a variant of normal mucosa and no treatment is necessary.

REFERENCES:

1. Bouquet, J.E. Reviewing oral leukoplakia. *JADA* 122:80-82, 1991.
2. Silverman, S. Oral cancer. *American Cancer Society*. Atlanta 1990

QUESTION 10

Alveolar bone loss in chronic periodontitis is

1. influenced by genetics.
2. constant over time.
3. affected by the host's reaction.

4. related to lack of antibody production.
5. caused by specific organisms.
A. 1, 2, 4, 5 B. 1, 3, 4, 5 C. 1, 2, 3 D. 2, 4, 5

ANSWER: B

RATIONALE:

Patient response to periodontal infections is complex. Genetic factors are seen to be responsible for increased susceptibility to periodontal diseases. One such example is localised juvenile periodontitis where neutrophil function is altered.

Periodontal diseases are chronic, but bone loss is not constant over time. Instead, there are healing periods following periods of active tissue destruction in specific sites. Measurement of factors which are responsible for healing, such as the negative regulators of the inflammation including transforming growth factor beta (TGF-beta), γ -interferon, the cytokine interleukin-4, and interleukin-1 receptor antagonists may provide an assessment of periodontal disease in remission, or in the healing phase after treatment.

Specific periodontal bacteria trigger inflammatory host responses which lead to tissue destruction.

Data are accumulating from clinical and in vitro studies which suggest that the neutrophil/antibody/complement axis is critical for protection against periodontal diseases. Abnormalities in this axis often lead to increased susceptibility.

Conditions such as irradiation and immunosuppressive drugs which interfere with the normal host defence mechanisms are contributory to disease advancement. So too are osteoporosis and HIV infection. Risk assessment of patients must take into account the existing periodontal status, family history of periodontitis, and genetic factors, as well as other diseases if treatment planning and therapy are to be effective in the long term.¹

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- Page, R.C., Beck, J.D. Risk assessment for periodontal diseases. *Int Dent J* 47:61-87, 1997.
- Genco, R.J. Host response in periodontal disease: current concepts. *J Periodont Res* 63(4) 338-355 supp. April 1992.

THIS MONTH'S FIVE NEW QUESTIONS

QUESTION 11

An otherwise healthy patient presents in your office with a history of a total hip replacement three years previously. You are planning to carry out extensive curettage because of existing periodontal disease. Current opinion is that

- A. no prophylactic antibiotic coverage is required.
B. prophylactic antibiotic coverage is required using penicillin orally.
C. prophylactic antibiotic coverage is required using amoxicillin orally.
D. prophylactic antibiotic coverage is required using a cephalosporin intravenously.

QUESTION 12

The modern approach to the management of dental caries calls for the use of preventive strategies not just the treatment of the disease and symptoms. In this approach, you would

- identify the infection risk level to caries.
- control the spread of the infection with antibiotics.
- observe for prevention of re-infection through recall.
- avoid probing of suspect fissures or smooth surfaces.
- remove any ditched amalgams that may be present.

- A. 1 and 2 B. 1, 2, 4, 5
C. 1, 3, 4 D. All of the above.

QUESTION 13

Gingivitis in young people is most severe between the ages of

- A. 1-2 years B. 3-6 years
C. 7-9 years D. 14-16 years

QUESTION 14

Triclosan is

- a broad-spectrum antibacterial agent
- used in toothpastes and mouthwashes
- able to reduce plaque accumulation
- not effective against gram positive microorganisms

- A. 1, 2, 3 B. 1 and 3
C. 2 and 4 D. 4 only E. All of the above

QUESTION 15

Extrinsic discolouration on teeth relies on the salivary pellicle for attachment.

Intrinsic discolouration of teeth can be countered by vital bleaching.

- A. The first statement is true, the second is false
B. The second statement is true, the first is false
C. Both statements are true
D. Both statements are false

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Journal

November
1998
Vol. 64
No. 10



Meetings With Employers Are Underway

James Gagnon

Recently, we began a series of meetings with major Canadian employers and employers' associations. It is very interesting to note that employers want these meetings and that they are as beneficial to them as they are to us.

At these meetings, we are attempting to bring forward the positions of Canadian dentists on dental plans and their content, as well as trying to determine the real needs of the patient (involved in the decision-making process) and what treatments are covered.

At a meeting with directors of the Canadian Federation of Independent Business (CFIB), an opportunity arose for us to define together a system of affordable and appropriate dental care for CFIB members. Of course, we examined the issue of managed care and were pleasantly surprised to discover that the CFIB, deeming such a concept ill-suited to the needs of its members, had already ruled it out. The members of our Steering Committee on Dental Benefits Issues had the privilege of meeting with Mr. Garth J. Whyte, the CFIB's vice-president of national affairs and research, to discuss the content of the dental plan proposed for CFIB members. This meeting, which was most enrich-

ing and worthwhile, took place in mid-October. The members of our committee had, as dentists, the opportunity to express their views on the content of a future plan for CFIB members. This is a major step forward in our relations with Canadian employers.

Dr. Burton Conrod and myself also represented the country's dentists as official spokespersons at a meeting with the Canada Post Corporation. As always, frankness was called for and the discussion was most interesting. It was a pleasure to note that the changes made to the various plans reflected some of the recommendations made by our committee in the past. This major corporation recognizes the importance of adequate dental care for the well-being of its employees and showed considerable initiative at recent negotiations held with all its employees.

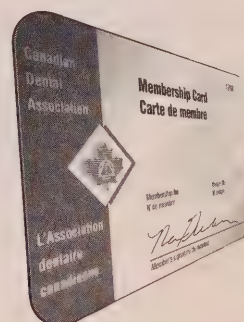
In the coming months, further meetings will be held at which committee members will participate actively and, in cooperation with the provincial associations, ensure maximum effectiveness nationally.

I believe we have much work to do. But from all appearances, the employers and the major central labour bodies want this type of

direct and gratifying exchange with Canadian dentists. Each of the parties concerned can only benefit from such a direct and cordial approach, and ultimately it is the patients/employees who will benefit. ■

Mr. James Gagnon is CDA's director of practice management support services.

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NUTRITION BITES



An eye for an eye, a tooth for a child?

Whether you've heard it or not, an international "old wives' tale" holds that for every child a woman has, a tooth is lost. In Denmark, "a tooth, a child" (i.e., *et barn, en tand*, for those of you who read Danish) was recently put to the test in an attempt to quantify the association between parity and tooth loss. The researchers assigned twins ($n = 2,978$; aged 73 years and older) registered in the Longitudinal Study of Ageing Danish Twins to one of five social classes. They found that those in the two highest classes had a similar distribution of tooth loss, as did those in the three lowest classes, but there was a considerable gap between the two groups (no pun intended).¹ Nevertheless, regardless

of social status, the number of teeth a woman had was indeed negatively correlated with the number of children she had borne.¹ While women of low social status had lost about one additional tooth per child, those of high social status had lost one for every two children. There was virtually no correlation for men. It was interesting to note that in 28 of 34 pairs of identical female twins with similar social status but dissimilar numbers of children born, the twin with more children had fewer teeth ($P < 0.001$).¹ Again, the same was not true for male twin pairs. Historically, caries and tooth loss have been associated with an increased risk of mortality.² The investigators suggested that the impact of child bearing on women's health may still be significant today.¹

Interestingly, an unrelated 1997 study ($n = 1137$) evaluated the relationship between dental status, nutrient intake and mortality in an elderly population (70-75 years old) in northern Italy and showed that inadequate dentition in women was, in fact, associated with higher mortality than adequate dentition.³ It was found that a significant association existed between dental status and dietary intake (especially of micronutrients) and that inadequate dentition and folate intake were each independent predictors of mortality, at least in women.³ It is noteworthy that denture wearers had dietary intakes similar to those with adequate dentition. However, the researchers were unable to define the relationship between dentures and mortality.³

Milk it for all it's worth!

According to calcium expert, Robert Heaney, "milk is a food designed by nature to support tissue growth, and thus it adds far more than calcium to the diet."⁴ In fact, according to current U.S. findings, milk is the number one food source of adults for five important micronutrients: calcium, riboflavin, phosphorus, potassium and magnesium.⁵ In Canada, the same is true of the first three.⁶



Increasing calcium intake with calcium-rich foods has been shown to improve overall diet quality.^{4,13}

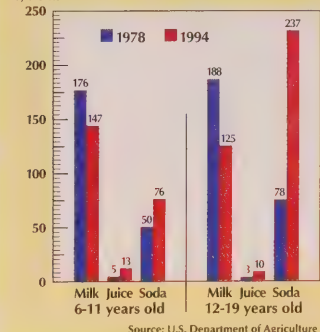
Unfortunately, few North American preadolescents,^{7,8} teens,^{7,9} or women^{7,8,10,11} manage to meet current calcium re-

quirements or get the minimum recommended two daily servings of dairy products.^{8,11,12} A recent Saskatchewan study assessed the diets of children, their mothers and grandmothers and found that dairy consumption decreased with each life stage (2.7, 2.0 and 1.6 servings, respectively).⁷ And, last year's General Mills Dietary Intake Study (U.S.) showed that over the last decade, calcium intake has declined significantly for 15-to-18-year-old female adolescents.⁹ That's a problem since low calcium in-

takes are generally considered a marker for a poor diet.^{4,13} On the other hand, eating foods high in calcium has been demonstrated to improve total diet

quality.^{4,13-15} The calcium and other essential nutrients (e.g., riboflavin, thiamin, potassium, magnesium, phosphorus, protein and vitamins A, B₆ and B₁₂) in milk products make them an ideal choice.¹³⁻¹⁵ And they also do a pretty good job of helping to build healthy teeth!

What kids drink!



- References:** 1. Christensen K et al. 1998. A tooth per child? *Lancet* 352:204. 2. Paine R. Cited by Christensen K et al. 1998. *Lancet* 352:204. 3. Appollonio I et al. 1997. Influence of dental status on dietary intake and survival in community-dwelling elderly subjects. *Age Ageing* 26:445-455. 4. Heaney RP. 1996. Food: what a surprise! *Am J Clin Nutr* 64:791-792. 5. Subar AF et al. 1998. Dietary sources of nutrients among US adults, 1989-1991. *J Am Diet Assoc* 98:537-547. 6. Agriculture Canada Nutrient Assessment Program, based on data from *Family Food Expenditure*, 1996. Special aggregation, 1998. 7. Looker AC et al. 1994. Calcium intake in the United States. Presentation, NIH Consensus Development Conference on Optimal Calcium Intake (June 6-8). Bethesda, Maryland. 8. Lemke B et al. 1998. Dietary patterns of a group of children, mothers and grandmothers. *Can J Diet Prac Res* 59:62-66. 9. Albertson AM et al. 1997. Estimated dietary calcium intake and food sources for adolescent females: 1980-92. *J Adolesc Health* 20:20-26. 10. Nova Scotia Heart Health Program. 1993. *The Report of the Nova Scotia Nutrition Survey*. Nova Scotia Department of Health, Halifax, N.S. 11. Bertrand L. 1995. *Santé Québec. Les Québécoises et les Québécois, mangent-ils mieux? Rapport de l'enquête québécoise sur la nutrition*, 1990. Gouvernement du Québec, Santé Québec. 12. Angus Reid Group. 1992. *The Canadian Food Study*. Angus Reid Group Inc. 13. Barger-Lux JM et al. 1992. Nutritional correlates of low calcium intake. *Clinics in Applied Nutr* 2:39-44. 14. Devine A et al. 1996. Nutritional impact of calcium supplementation by skim milk powder or calcium tablet on total nutrient intake in postmenopausal women. *Am J Clin Nutr* 64:731-737. 15. Fleming KH and Heimbach JT. 1994. Consumption of calcium in the U.S.: food sources and intake levels. *J Nutr* 124:1426S-1430S.



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NEWS UPDATE

CDA's Associate Executive Director Honoured

Mr. Brian Henderson, associate executive director of CDA, was recently named a fellow of the Royal College of Dentists of Canada. In addition to serving as CDA's associate executive director, Mr. Henderson is also director of the Commission on Dental Accreditation of Canada.



Mr. Brian Henderson

Prior to joining CDA, he held various positions, including coordinator of the Allied Medical Education and Accreditation programs at the Canadian Medical Association and Dean of the Health Sciences Department at Algonquin College in Ottawa.

Mr. Henderson has also served on numerous professional and community organizations including three years with Health and Welfare Canada's Medical Device Review Committee. In awarding this honour, the College noted the respect and trust that Mr. Henderson has gained from all the professionals working with him. ■

CFDS Deployed In Support Of Swissair Disaster

On September 5, 1998, answering an urgent official call from the Nova Scotia Chief Medical Examiner's Office, the Canadian Forces Dental Services (CFDS) rapidly and effectively mobilized a contingent of more than 30 personnel from several

bases across Canada. This team, supplemented by two mobile dental clinics and a significant amount of equipment and supplies, deployed to CFB Shearwater in support of the recovery operation dealing with the aftermath of the Swissair Flight 111 disaster.

Termed "OPERATION PERSISTENCE" by the Canadian Forces, the overall mission was not only an attempt to recover the remains of the aircraft in hopes of determining the cause of the crash, but also, and perhaps more importantly to the families of the 229 victims who perished on board, an effort to recover and identify human remains. The CFDS has been intimately involved in the enormous challenge of this latter role, by putting to use its forensic dental techniques and by assisting the RCMP in various techniques of

acquiring quality fingerprints. Through the end of September 1998, the forensic dental team, including four local civilian and 10 military dentists trained in dental forensics, was instrumental in 40 out of a total of 57 positive identifications. Look for a more detailed account of the role of forensic dentistry and the CFDS in this mission, in a future issue of the *CDA Journal*. ■

Ontario Neurotrauma Foundation Awards Grant

Dr. David Kenny, research coordinator of dental services at the Bloorview MacMillan Centre in Toronto, was recently awarded a \$75,000, two-year grant, to study feeding dysfunction in children and adolescents with recent traumatic brain injuries. The research will focus on recovery, critical indicators



"The Trial of Peter Grimm" (24" x 36", acrylic on board)

Cover Artist: Dr. Blake Harley

Dr. Blake Harley of Fonthill, Ont., is this month's featured artist. A 1950 graduate of the University of Toronto Faculty of Dentistry, Dr. Harley practised in St. Catharines, Ont., until his retirement in 1988. "The Trial of Peter Grimm" is based on a photograph taken by Dr. Harley's son while on a visit to the Soviet Union.

Guided by intriguing expressions, colours and incidents, Dr. Harley prefers the "narrative" portrait, depicting a situation, as opposed to classical posed portraits. A relaxing hobby, his art has reaped numerous awards and recognitions. Dr. Harley currently serves on the board of governors of the Rodman Hall Art Centre in St. Catharines allowing him to stay in tune with the local art community. ■

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Dr. Jean-Marc Brodeur (left), president of the Quebec Association of Dental Public Health Specialists presents Dr. Martin Payette (right) with the Paul Simard Prize, in recognition of his outstanding contribution to the development of public health dentistry in Québec. For more than 25 years, Dr. Payette was a pioneer in dental health research having authored numerous surveys and research projects. Dr. Payette was honoured during his recent retirement celebration. ■

and feeding therapy. Approximately 20 per cent of children with severe head injuries lose their ability to intake food by mouth.



Dr. David Kenny

Dr. Kenny will be assisted by Dr. Michael Casas, coordinator of the Feeding Disorders Research Unit at the Hospital for Sick Children in Toronto, and Dr. Roxanna MacMillan from the Pediatric Dentistry Department of the University of Toronto. ■

Benzodiazepines During First Trimester Not Linked To Cleft Palate, Study Says

A recent study published in the *British Medical Journal* (BMJ) sug-

gests that there is no link between exposure to benzodiazepines, used during the first trimester of pregnancy, and major malformations or cleft lip or palate. Benzodiazepines are commonly used for anxiety, insomnia or epilepsy and their use is substantial even among pregnant women. Conflicting evidence exists about whether first trimester exposure to benzodiazepines increases the risk of major malformations or oral cleft. This study found that fetal exposure to benzodiazepines was not associated with major malformations or oral cleft, but smaller pooled analysis on the basis of data from case-controlled studies found significantly increased risk for major malformations or oral cleft. To view the complete study visit the BMJ Web site at: www.bmj.com/cgi/content/full/317/7162. ■

Eighty Years Of Dental Education In Alberta

The University of Alberta is celebrating 80 years of dental education with year-long events and festivities. Dental education had its start in Alberta in the fall of 1918 when the university accepted its first three students. At that time, those students were admitted to

the Faculty of Medicine and were required to study the same subjects as the medical students. Today, 80 years later, dental education in Alberta has come full-circle with the recent merger of the Faculty of Dentistry into the Faculty of Medicine and Oral Health Sciences.

To celebrate the anniversary, lectures and expositions have been ongoing since May. A closing celebration banquet was held on November 4. ■

Academy Of Computerized Dentistry Formed

To initiate and support research in practical dentistry involving the use of computer-supported methods of restorative treatments in odontology, is the mission of the recently established Academy of Computerized Dentistry.

The Academy will offer its members continuing and specialized training within the scope of the society's purpose. It also intends to cooperate with national and international institutions in order to further the exchange of experience and research, and will support work and projects within its mandate.

Dr. J.P. van Hazel was elected president of the Academy. Anyone wishing to obtain more information can contact Dr. van Hazel at: Tel.: (519) 623-7001, fax: (519) 623-6890 or by e-mail at: dental@easynet.on.ca. ■

APPOINTMENTS

CDAA Hires New Executive Director

The Canadian Dental Assistants' Association (CDAA) has appointed Mr. Rob Henderson of Ottawa to the position of executive director. Mr. Henderson assumed his new responsibilities effective October 13, 1998. Prior to joining CDAA, he was executive director of the Canadian Journalists Association (CJA). During his four years at the CJA, Mr. Henderson was responsible for conference planning and promotion, policy formulation, financial planning and membership recruitment. ■

ODQ Appoints New Executive Director

Dr. Diane Legault was recently appointed as executive director and secretary of the Ordre des dentistes du Québec (ODQ). A graduate of the University of Montreal, Dr. Legault also holds an MBA from the University of Sherbrooke. She maintained a private practice from 1979 to 1994, when she accepted a position as assistant to the vice-president of Systèmes Purkinje. She maintained that position until 1996 when she became director of professional services at the ODQ. Dr. Legault

assumed her new responsibilities as of August, 1998. ■



Dr. Diane Legault

INFORMATION PACKAGE

November 1998

This month's package contains a selection of reading materials on **evidence-based dentistry**. It is available to CDA members for \$5.00 plus applicable tax.

A complete list of information packages is available upon request by calling 1-800-267-6354 or can be easily accessed on the CDA Web site at www.cda-adc.ca. Once inside our site, please log into the "CDA Members" area and click on "Resource Centre" and a list of packages can be viewed.

New Acquisitions

Meehan, John G., Robb, Nigel, D. and Seymour, Robin, A. *Pain and anxiety control for the conscious dental patient*. Oxford University Press, 1998.

Lindhe, Jan. *Clinical periodontology and implant dentistry*. Munksgaard, 1997.

Block, Michael S., Kent, John N. and Guerra, Luis R. *Implants in dentistry*. Saunders, 1997.

Little, James W. et al. *Dental management of the medically compromised patient*, 5th ed. Mosby, 1997.

Arens, Donald E. *Practical lessons in endodontic surgery*. Quintessence, 1998.

Nevins, Myron and Mellonig, James T. *Implant therapy: clinical approaches and evidence of success*. Volume 2. Quintessence, 1998.

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DEBATE



The Truth About Fee Guides

Michael G. Christensen, DDS

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I have been pondering the words of Dr. Donald L. Rife, past-president of the CDA, in his article *The Truth About Fee Guides* (*J Can Dent Assoc* 1998; 64:480-2), and have come to the conclusion that he is really no closer to the truth than Dr. David Schwab was (D. Schwab, *Dentistry After the Fee Guide*. *J Can Dent Assoc*, 1998; 64:321-2). Unfortunately, both individuals have chosen to look at only one side of the very complex issue that is standardized fee guides.

A fee guide that has wide acceptance by insurance companies in a market saturated by insurance plans is certainly much closer to a fee schedule than a fee guide. Most of my patients have dental insurance. In fact, most receive 100% coverage of the Ontario Dental Association (ODA) fee guide for many procedures, leading them to believe that all of their dental expenses are covered. They are, therefore, far from pleased when I want to charge in excess of the fee guide for a particular procedure, even when mitigating factors warrant the increase and are discussed before treatment. The patient who has a 100% coverage plan believes 100% of all charges are going to be paid by the insurance com-

pany. This prevalent attitude helps explain why the fee guide has actually become a fee schedule, and by not rectifying this belief, the insurance companies and dental associations have placed very real limits on fees in Canada.

The pre-eminent expert on dental fees in the U.S. is Dr. Tom Limoli, director of Atlanta Dental Consultants. He has compiled average fees for every county in the U.S. When I became acquainted with Dr. Limoli's work some months ago, I sent him my ODA fee guide for analysis. The results were shocking. On average, our fees are 42% lower than the average U.S. fees. (Keep in mind that the Canadian dollar has lost quite a bit of its value since his calculations were done in the first part of 1998.) No market in the entire U.S. has a fee structure as low as the ODA fee guide. This discrepancy exists in spite of the fact that the standard of care is the same in Canada as it is in the U.S.

Some of our fees are particularly appalling. Take extractions, for example. The fee for a simple extraction in the ODA guide is \$44.48 (Cnd.), while in the U.S., the average fee for the same procedure is \$80 (U.S.). The fee for a second extraction in the same quadrant is \$22.24 in the ODA guide,

compared to an average of \$74 in the U.S. The point I am getting at is that for some procedures, the fee guide is simply not realistic. Just don't do extractions, you might counter. That solution is too simplistic. Patients want, and to a large extent expect, full-service dentistry. And most patients who want a tooth extracted want it out as soon as possible. Yet in my town, for example, there is an oral surgeon in the area only four days a month. So to refuse to do an extraction is to risk losing a patient—and potentially his or her whole family. This is a fact of life in a marketplace where there is quite literally a dentist on every street corner, and where patients can shop around until they find one that will provide the needed treatment and adhere to the fees. As a result, the fee guide is used much more as a fee schedule. Complicating the matter is the fact that sometimes the fees listed in the guide are viewed by the government and others as a ceiling from which to begin their reductions.

A provincial fee guide very definitely causes a loss of control for the individual dentist. If fees were fair, however, most dentists would gladly give up worrying about them in order to enjoy the organizational security (real or imagined) offered by adhering to the fee guide. There

is certainly no reason why any fee should be as unrealistic as the one listed in the ODA guide for extractions. Many people work on continuously updating the fee guide. That such a glaring aberration as the extraction fees quoted above (and many others not mentioned here) would be allowed to stand year after year is appalling indeed. It is in cases such as these that the picture painted by Dr. Schwab, of a style of doing business reminiscent of a smoke-filled club full of good old boys too gentlemanly to discuss fees and competition, starts to look like it could be based on reality.

The fee guide does place very real limits on dentists' ability to charge what they want for a service. And there is no denying that the provincial fee guides have effectively slowed the increase in fees in this country over the years. Having said that, it is important to note that dentists and patients overall find the fee guide to be a good thing — when the fees are realistic. Some fees very clearly are not. Real change is needed immediately to keep the fee guide system from collapsing. ■

Dr. Christensen is a full-time private-practice general dentist in Kenora, Ont.

The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the Canadian Dental Association.



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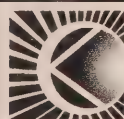
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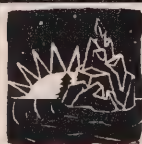
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The Canadian Dentists' Insurance Program: Keeping Pace With the Changing Times

When asked at the prime of his career to reveal his secret for remaining the top goal scorer year after year, hockey great Wayne Gretzky replied, "I skate to where the puck is going to be, not where it has been."

As on the hockey rink, being a leader on the insurance playing field requires foresight — the ability to anticipate participants' insurance requirements and to provide plans which are right for today, and for tomorrow. Because CDSPI sees clearly dentists' unique insurance risks and consistently delivers insurance plans that stay on top of these risks, it's no surprise that the Canadian Dentists' Insurance Program remains the number one insurance choice for Canada's dental profession.

Improvements made to the Canadian Dentists' Insurance Program for 1999 illustrate how CDSPI tailors insurance coverage for the dental profession's evolving needs.

Malpractice Insurance (available to dentists outside Ontario and Quebec)

For 1999, the *extended* coverage offered through the Program's malpractice insurance plan will be greatly improved. Currently, this

feature provides *dentists who are no longer practising* (due to voluntary retirement, disability or death) with continued malpractice insurance after their paid insurance ends. As well, dentists whose licences have been suspended or revoked have limited coverage extension. As a result, dentists in the situations described have malpractice insurance available in the event they are sued for incidents relating to their professional service.

But starting January 1, 1999, the extended coverage feature will also provide protection for *practising dentists* in the Program and, for cases involving licence suspension or revocation, higher insurance limits (than were offered in 1998) will be available. The enhanced coverage will apply to a broader range of practising and non-practising situations (for instance, if your coverage is cancelled because you miss a monthly or quarterly insurance payment or if you've been forced to allow your malpractice insurance to lapse due to bankruptcy, and you receive notice of a claim before you can restore your paid coverage back to good standing). However, the coverage level you receive in such situations will be less than under your paid coverage.

Recognizing that a malpractice claim is a risk that's inherent to practising dentistry, the Program responded with extended coverage to protect dentists and the profession more thoroughly. The public also benefits since better protection for the dental profession means better protection for patients as well.

TripleGuard™ Insurance

In the new year, protection against pollution-related office insurance claims will be enhanced for TripleGuard™ participants. TripleGuard™ will now cover property damage costs for a broader range of pollution-related claim situations, such as damage to dental office contents resulting from the accidental spillage of hazardous materials including mercury. (Some exclusions apply, however. Please contact CDSPI for more details.)

Accidental Death and Dismemberment Insurance

In the first three months of 1999, participants currently in the Accidental Death and Dismemberment (AD&D) plan won't have to pay any premiums due to positive claims experience of the plan this year. Surplus funds in the AD&D plan will cover costs so

participants can enjoy this three-month premium holiday.

Dental Office Staff Insurance

In 1999, *insurance offered to dental office staff will be considerably improved*, providing added flexibility and lower rates for staff members, including hygienists, certified dental assistants, receptionists and other support staff.

The Dental Office Staff Insurance available through the Canadian Dentists' Insurance Program was designed to be comparable to employee benefit packages provided in the insurance marketplace. And, as is the case with most benefit packages, staff members requiring Dental Office Staff Insurance must currently purchase all of the package (consisting of life, disability and accident insurance), or nothing at all.

That changes in 1999, however. Commencing January 1, 1999, dental staff will be able to purchase Basic Life and Long-Term Disability coverage separately, if that is their wish. Staff members with the existing insurance package can also "unbundle" their coverage. While the life and accident portions of the coverage will still be packaged together, the unbundling of the life and disability coverage *provides greater flexibility* for staff members since, now, they will be able to tailor coverage more specifically to their income levels and to their own personal insurance requirements.

Additionally, a previous restriction preventing some part-time staff from purchasing life insurance has been removed for 1999. (To qualify for coverage, as usual, dental staff must work for a dentist who is eligible to obtain insurance through the Canadian Dentists' Insurance Program. And, staff may be required to submit medical evidence of insurability and/or proof of income to purchase new coverage or add to existing coverage.)

Dental staff will also benefit from lower rates in 1999, since life and disability rates have been reduced. Rates will be, on aver-

age, 5 to 30 per cent lower. AD&D insurance rates will remain the same but they're already extremely economical — \$11.50 for \$50,000 of AD&D single coverage (or \$17.25 to cover the entire family), and \$2.30 for each additional \$10,000 of single AD&D coverage (or \$3.45 per additional \$10,000 of family coverage). Life insurance is also available to cover spouses and dependent children of staff members.

CDSPI worked closely with the insurers for each of the respective plans to negotiate the changes and improvements mentioned for 1999. You'll receive full details on these changes by mail if you are a Canadian Dentists' Insurance Program participant. In the meantime, if you require further information, please contact CDSPI at 1-800-561-9401 or (416) 296-9401, extension 234. (B.C. residents call Professional Integrated Insurance Services at 1-888-318-8188, or (604) 322-9001 in Vancouver.)

Year 2000

No doubt you've heard something about the Year 2000 computer problem a.k.a. "the millennium bug." The problem affects computer hardware and software which have been programmed to store dates using only two digits for the year. On January 1, 2000, these systems may interpret the year as 1900 and malfunction.

It's thought that up to 90 per cent of computer hardware and software will be affected in some manner by this computer glitch, so if you run a computerized dental practice you should be concerned since insurance to cover financial losses arising from Year 2000 computer problems generally *won't be available*. If you are a participant in any of the Canadian Dentists' Insurance Program's general insurance plans — Triple-Guard™, Personal Umbrella Liability, Legal Expense or Malpractice Insurance — you should be aware that *the Program won't cover Year 2000-related losses*. Therefore, you need to be proac-

tive about finding and implementing solutions (see checklist). Otherwise, your dental practice could be disrupted by Year 2000 computer problems.

Year 2000 Checklist

Below, you'll find a short checklist showing you how to assess your Year 2000 risk and how to take steps to reduce your risk, starting right now.

- ☐ Obtain professional advice to determine which of your business operations will be affected by date-sensitivity problems and ask for recommended solutions, starting with vendors, service providers and computer software manufacturers. You may also want to consult with other dentists who have already had their systems corrected.
- ☐ Select the best solutions out of the ones you're offered and allocate the financial and human resources required to implement them now.
- ☐ Prioritize the changes you must make, fixing first the systems which are most critical to your business operations.
- ☐ Allow adequate time for testing of the corrected systems (to determine whether your systems will respond as expected when year 2000 rolls around). Ensure that consultants you hire are willing to guarantee their work in writing and take responsibility for errors.
- ☐ Develop a contingency plan to ensure business continuity in case of failure of your systems. This should include having up-to-date back-ups of your systems and, whenever possible, preparing for the impact of potential systems failures of companies on which you rely.

The steps outlined above should serve as a general guide only. For specific advice relevant to your own needs, you must seek professional assistance. ■



CDSPI

Journal

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1998
Vol. 64
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Canadian Equity Fund (Trimark) ^{†1}	-15.1%	7.0%	8.4%	10.1%	✓
Special Equity Fund (KBSH) ^{†2}	-26.9%	22.6%	19.9%	n/a	✓
TSE 35 Index Fund (Sun Life of Canada) ^{††}	-14.1%	10.9%	11.4%	8.5%	✓
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Pacific Basin Fund (KBSH)	-20.4%	-2.5%	n/a	n/a	✓
US Equity Fund (KBSH) ^{†3}	-6.8%	14.9%	14.1%	15.5%	✓
Global Fund (Trimark) ^{†4}	-12.6%	7.4%	12.1%	14.2%	✓
Global Stock Fund (Templeton) ^{†5}	-6.0%	n/a	n/a	n/a	✓
S&P 500 Index Fund (Sun Life of Canada) ^{††}	19.7%	27.3%	22.5%	19.3%	✓
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Bond & Mortgage Fund (Canagex)	6.4%	9.1%	8.0%	10.1%	✓
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CDA CASH AND EQUIVALENT FUND					
Money Market Fund (Canagex)	3.8%	4.1%	4.7%	7.0%	✓
CDA GROWTH AND INCOME FUNDS					
Balanced Fund (KBSH)	-6.8%	9.9%	8.7%	9.4%	✓

CDA figures indicate annual compound rate of return. All fees have been deducted. As a result, performance results may differ from those published by the fund managers. CDA figures are historical rates based on past performance and are not necessarily indicative of future performance.

[†] Returns shown are those for the following funds in which CDA funds invest: ¹Trimark Canadian Fund, ²KBSH Special Equity Fund, ³KBSH US Equity Fund, ⁴Trimark Fund, ⁵Templeton Global Stock Trust Fund, ⁶McLean Budden Fixed Income Fund.

^{††} Returns shown are the total returns for the indexes tracked by these funds.

^{†††} Introduced in September 1998.

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No. 10



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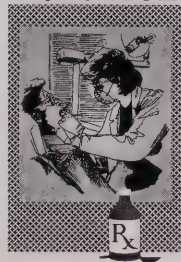
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CLINICAL PRACTICE



Clinical Criteria For the Use Of a Decision-Making Framework For the Medically Compromised Patient: Hypertension and Diabetes Mellitus

H.J. Lapointe, DDS, PhD, FRCD(C)

J.E. Armstrong, DDS, M.Sc., MRCD(C)

B. Larocque, MD, FRCP(C)

ABSTRACT

In this article, clinical criteria for the staging of disease severity in patients with hypertension and diabetes mellitus are presented. This paper is intended to supplement a previous article by the authors on the use of clinical criteria for the classification of patients with ischemic heart disease and chronic obstructive pulmonary disease and the use of a decision-making framework for the medically compromised patient.¹ Hypertension and diabetes mellitus are discussed in terms of pathophysiology, risk factors, clinical manifestations of disease and disease progression. The article will allow practitioners to stage patients with hypertension and diabetes mellitus and to apply this staging to the previously established clinical decision-making framework for medically compromised patients.

MeSH Key Words: decision making; dental care for chronically ill; diabetes mellitus; hypertension; severity of illness index.

© J Can Dent Assoc 1998; 64:704-9

This article has been peer reviewed.

Strategic Reserve, Systemic Illness and Loss Of Strategic Reserve

Systemic disease may be thought of as an erosion of an organ system's reserve or ability to respond to internal or external stresses. This diminished adaptive capability results in an increased potential for system failure and medical emergencies as the individual is stressed by apprehension or by the physical demands of dental procedures. From this perspective, it is important to know not only what disease the patient has, but also what reserve he or she has left. In a previous article discussing ischemic heart disease and chronic obstructive pulmonary disease, the authors

proposed a scale of 1 to 4 to classify the severity of systemic disease. Stages 1 through 4 represent progressively worsening disease and loss of adaptive capability.¹ Hypertension and diabetes mellitus are two other common conditions that lead to tissue damage and reduced strategic reserve and lend themselves to similar analysis.

Hypertension

Definition: Hypertension is an elevation in the blood pressure to a level of 140/90 or greater. A diagnosis is not made on the basis of a single measurement but requires confirmation on at least two further measurements at separate times. Further, the reading should be taken after five minutes of rest and using an appropriate cuff and appropriate

technique. The importance of the routine measurement of blood pressure cannot be overemphasized. Blood pressure measurement in the dental office is an effective screening tool that alerts patient, dentist and physician to an unsuspected potential problem.²

Incidence and Risk Factors: Hypertension is an extremely common disorder. In a relatively recent article describing the 20 most commonly prescribed drugs, 8 of the 20 were drugs that are given for hypertension or its effects on end organ systems.³ Overall, hypertension affects 20% of white North Americans and 30% of black North Americans 18 years of age or older. As patients age, the prevalence increases,

Table I

Classification Of Severity — Disease Classification By Blood Pressure Measurement⁶

Category	Systolic (mm Hg)		Diastolic (mm Hg)
Optimal	<120	and	80
Normal	<130	and	<85
Class I (high normal)	130-139	or	85-89
Class II (Stage 1)	140-159	or	90-99
Class III (Stage 2)	160-179	or	100-109
Class IV (Stage 3)	≥180	or	≥110

When systolic and diastolic blood pressure fall into different categories, the higher category should be selected to classify the individual's blood pressure status.

Table II

Disease Classification By Complexity Of Pharmacology — Hypertension

Class 1	non-pharmacologic treatment (weight reduction, salt restriction, moderation of alcohol consumption, cessation of smoking, exercise)
Class 2	non-pharmacologic treatment plus ... single standard drug therapy (thiazide diuretic, beta blocker, ACE inhibitor or calcium channel blocker)
Class 3	non-pharmacologic treatment plus ... combination standard drugs or higher doses of initial drugs or both
Class 4	non-pharmacologic treatment plus ... combination standard drugs or higher doses of initial drugs or both plus other antihypertensives (such as alpha blockers [terazosin], hydralazine, minoxidil, aldomet)
Examples: Thiazide diuretic (potassium losing): hydrochlorothiazide Potassium-sparing diuretics: spironolactone, triamterene Combination diuretic: diazide (hydrochlorothiazide and triamterene) Beta blockers: atenolol, metoprolol, propranolol, timolol Angiotensin converting enzyme inhibitors (ACE inhibitors): captopril, enalapril Calcium channel blockers (CCBs): nifedipine, verapamil	

Note: Patients whose hypertension is refractory to treatment at a given level should be classified at the next highest level.

going up to 64% of people between the ages of 64 and 74.⁴ In addition to race and increasing age, obesity and increased salt intake put patients at increased risk of hypertension.⁵

Pathology: Fewer than 5% of hypertensive patients have hypertension secondary to an identifiable cause such as renal disease, adrenocortical hyperfunction, pheochromocytoma or thyrotoxi-

cosis. The remainder have essential hypertension, which has no identifiable etiology; however, there is recognized to be a failure in the regulation of vascular resistance. In the long term, hypertension results in arterial damage, which leads to end organ damage in areas such as the heart, retina, kidneys and brain.²

Clinical Manifestations: In many patients there is no clinical manifestation of hypertension other than an increase in the measured blood pressure. This increase may persist for many years before other clinical signs or symptoms occur. Usually, clinical signs and symptoms of hypertension are an indication of vascular damage in end organs such as the retina or the heart. Early symptoms include occipital headache, vision changes, ringing in the ears, dizziness, weakness and tingling of the hands and feet. Progression of the disease can result in congestive heart failure, stroke, ischemic heart disease (angina or MI), renal failure or blindness.² Hypertension is the key risk factor for atherosclerotic coronary artery disease, accounting for 35% to 45% of annual cardiovascular morbidity and mortality. The greatest risk of hypertension-associated coronary complications is concentrated in patients with hypercholesterolemia, impaired glucose tolerance or left ventricular hypertrophy and in patients who smoke.⁴

It is the manifestations of end organ damage that are of concern in the dental management of patients with hypertension. Stroke and myocardial infarction brought on by the stress of a procedure are two of the potential acute manifestations of hypertension that we may see in the dental setting.

Disease Classification By Blood Pressure Measurement: Elevation in blood pressure is categorized from high-normal to severe based on measurement. Both the systolic and the diastolic readings must be taken into account by the physician making the diagnosis (Table I).^{2,6}

Disease Classification By Complexity Of Pharmacology: In the management of hypertension, a

Table III

Diabetes — Disease Classification By Clinical Symptomatology Associated With Control Of Diagnosed Diabetes

Class 1	asymptomatic
Class 2	occasional mild hypoglycemia*
Class 3	occasional moderate or severe hypoglycemia* or hyperglycemia
Class 4	frequent hypoglycemia* or hyperglycemia as a function of brittle diabetes, non-compliance or concomitant acute illness (e.g., infection)
* Stages of hypoglycemia⁹	
mild	hunger, weakness, tachycardia, pallor, sweating, paresthesias
moderate	incoherence, uncooperativeness, belligerence, lack of judgment, loss of orientation
severe	unconsciousness, tonic or clonic movements, hypotension, hypothermia, rapid thready pulse

Table IV

Diabetes — Disease Classification By Clinical Symptomatology Of Systemic Disease Secondary to Diabetes

Class 1	asymptomatic
Class 2	early vision changes mild angina early renal disease, proteinuria decreased peripheral circulation and early neuropathy (sensory, motor or autonomic)
Class 3	established diabetic retinopathy moderate angina, history of remote MI (> 6 months) established renal disease, hypertension established neuropathy and peripheral vascular disease, pressure ulcers, non-healing wounds
Class 4	blindness severe angina, history of recent MI (< 6 months) or stroke, renal failure, dialysis amputations

staged or stepped approach to pharmacological management is recommended. As hypertension worsens or proves resistant to therapy, the drugs used to treat it may be increased in dose, changed or increased in number. Careful analysis of the patient's list of drugs usually indicates the medical diagnosis, and analysis of changes in therapy helps to deter-

mine the level of severity (**Table II**).⁶

When therapy is successful, it is recommended that effort be made to decrease the number and dose of medications to a minimal maintenance level. Reduction is most effective in patients who continue to follow non-pharmacologic therapeutic recommendations, such as regular exercise, weight loss, salt restriction, mod-

eration of alcohol intake and cessation of smoking.⁶ In reality, most patients stay on lifelong therapy to maintain control.⁴

Level Of Risk and Procedural Complexity: In any clinical situation, the systemic disease state of the patient must be assessed along with the procedural complexity and the relative risk of complications. In the case of hypertension, previously undiagnosed or poorly controlled hypertension should trigger a referral back to the physician for further assessment and possible initiation or modification of antihypertensive therapy.

Diabetes Mellitus

Definition: Diabetes mellitus is a diverse group of disorders that produce hyperglycemia as a prominent manifestation, ultimately as a function of the inability to secrete enough insulin to meet metabolic needs. The two most common forms of this disease are Type I diabetes and Type II diabetes.⁷

Type I accounts for approximately 25% of patients with diabetes; its onset is most commonly seen in childhood or young adulthood. It is caused by immune-mediated destruction of the insulin-producing beta islet cells of the pancreas. The destruction of these cells leads to almost total loss of production of endogenous insulin. For patients with Type I diabetes, insulin injection is required to regulate glucose levels and prevent diabetic ketoacidosis.

Type II accounts for approximately 75% of patients with diabetes; its onset is usually after age 40. Patients with Type II diabetes produce insulin; however, there may be inadequate production or resistance to its action. These patients are not ketosis prone. Type II diabetes may be managed by diet and weight control, oral hypoglycemics or insulin to regulate glucose levels.^{7,8}

Incidence and Risk Factors: It is estimated that 2% to 4% of North Americans have diabetes mellitus. Auto-immune reactions, possibly triggered by viral illness (such as rubella or cytomegalovirus), are

Table V

Type I Diabetes — Disease Classification By Complexity Of Pharmacology

Class 1	excellent glycemic control with minimal changes in dosage regimen
Class 2	good glycemic control with occasional changes in regimen
Class 3	poor glycemic control with frequent changes in regimen
Class 4	poorly controlled as a function of brittle diabetes, non-compliance or concomitant illness (e.g., infection)

Table VI

Type II Diabetes — Disease Classification By Complexity Of Pharmacology

Class 1	disease control by diet, exercise and weight loss
Class 2	disease control with single oral hypoglycemic agent*
Class 3	disease control with oral hypoglycemic agents or insulin or both
Class 4	poorly controlled as a function of brittle diabetes, non-compliance or concomitant illness (e.g., infection)

* Examples: chlorpropamide, tolbutamide, glyburide, metformin, phenformin

Table VII

Classification Of Procedural Stress

Level 1	examinations, radiographs, denture adjustments, etc.
Level 2	scaling/root planing, simple restorations, uncomplicated extractions or impressions, etc.
Level 3	lengthy crown and bridge procedures, complex extractions, dental implant placement, etc.
Level 4	difficult impactions, trauma surgery, etc.

causative in the development of Type I diabetes. Although both Type I and Type II diabetes have genetic components, genetics are a greater factor in Type II. In addition to genetics, obesity has a poorly understood but important role in the development of Type II diabetes.⁹

Pathology: The primary defect in Type I diabetes is immune-mediated destruction of the insulin-producing pancreatic islet cells. The destruction of these cells leads to an absolute defi-

ciency of insulin. In contrast, the patient with Type II diabetes continues to produce insulin in variable amounts. In addition to reduced insulin (in some cases), the defect in Type II diabetes appears to lie in a reduction in insulin receptors and reduced post-receptor activity.⁹ In a patient with either type of untreated diabetes, the relative lack of insulin results in hyperglycemia combined with an inability to use glucose. In the patient with Type I diabetes, this combination can

lead to potentially life-threatening diabetic ketoacidosis.

The long-term implication of diabetes is the development of vascular complications secondary to microangiopathy and accelerated atherosclerosis. These complications usually start to occur 15 to 20 years after the initial diagnosis.⁸ The vascular complications lead to complications in various organ systems, most notably the kidneys, the heart, the peripheral vascular system and the eyes.⁷

Clinical Manifestations: The classic triad of polydipsia, polyphagia and polyuria seen in acute Type I diabetes is secondary to hyperglycemia combined with an inability to metabolize glucose. This combination leads to the metabolizing of fat stores and the development of ketoacidosis. It is very uncommon for a diabetic patient to present in a dentist's office in this condition. The patient at that stage is usually quite ill and is far more likely to be seen by the family physician or in the emergency room. In contrast, the dental practitioner frequently has the opportunity to manage the dental problems of the patient with diagnosed diabetes.⁹

Disease Classification By Clinical Symptomatology: Even when diabetes is well controlled, patients present with long-term manifestations of the underlying disease. The clinical signs and symptoms of the patient with diagnosed diabetes are either due to problems with control of the underlying diabetes or are associated with other systemic disease secondary to the microangiopathy and atherosclerosis associated with long-standing diabetes (**Tables III and IV**).⁷

Disease Classification By Complexity Of Pharmacology: The control of hyperglycemia associated with diabetes and the avoidance of hypoglycemia as a result of medication overdose, inadequate caloric intake or excess exercise require careful monitoring and balance of therapy. In the patient with Type I diabetes, management absolutely requires exogenous insulin. In the patient

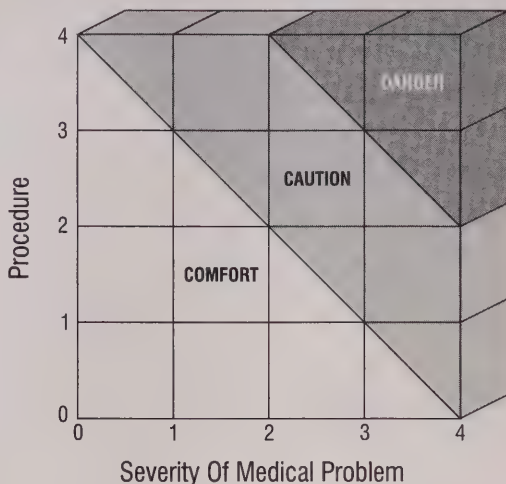


Fig. 1: Correlation of medical compromise with procedural stress: A grid system is used to plot the severity of the patient's medical problems (horizontal axis) against the anticipated stress of the proposed procedure (vertical axis). The point at which these two intersect falls within the comfort, caution or danger zone of the practitioner.

with Type II diabetes, therapy may range from weight and diet control to individual or combination oral hypoglycemics, with or without insulin. All of these therapies require careful monitoring of blood glucose levels to avoid extremes in serum glucose as well as to minimize the long-term systemic complications of diabetes (Tables V and VI).^{7,8}

The dental practitioner must be aware of the potential for acute problems associated with the underlying disease (hyperglycemia and hypoglycemia) or its systemic manifestations (ischemic heart disease, peripheral vascular disease, etc.) or both. In addition, the practitioner must be alert to the fact that dental treatment may cause disruptions in the patient's balance between caloric intake and insulin or oral hypoglycemic therapy. This disruption has the potential to lead to an acute hypoglycemic episode, which can be a life-threatening medical emergency. Precautions such as early morning appointments and advising the patient to take her or his normal medications and meals help prevent such complications in the ambulatory setting.⁹

Procedural Stress: The prevention of systemic complications requires the maintenance of a careful balance between the stress of the procedure and the patient's ability to cope with that stress. The ability to maintain this balance is predicated on careful analysis of the patient's systemic reserve (as suggested on a scale of 1 to 4) as well as an understanding of the stresses involved in various procedures. As in the authors' previous publication, a simple classification of procedures is presented for the purposes of assessing the balance between systemic disease and procedural stress (Table VII).¹ Please note that patient anxiety may increase the stress to the patient and must be considered as part of the analysis.

Determination Of Relative Risk and Treatment Planning: Disease severity and risk can be correlated using the proposed grid system. Disease severity from 0 to 4 is plotted on the horizontal axis, and procedural stress from 0 to 4 is plotted on the vertical axis (Fig. 1). The positions and slopes of the lines that divide comfort, caution and danger zones vary from clinician to clinician and, for a given

clinician, from situation to situation. These variances depend on:

1. the clinician's training and experience with the proposed procedure;
2. the clinician's familiarity with the systemic disease and its implications;
3. the procedural complexity;
4. the severity of the disease;
5. the facilities and equipment available;
6. the urgency or emergency of the proposed treatment.

Should a given procedure in a given patient exceed the practitioner's comfort or caution levels, then modification of treatment plan or referral to a physician or specialist may be warranted.¹

Summary

This article has proposed clinical criteria for the classification, on a scale of 1 to 4, of loss of systemic reserve for patients with hypertension or diabetes mellitus. These criteria complement the clinical criteria for ischemic heart disease and chronic obstructive pulmonary disease proposed in a previous article.¹ The criteria allow practitioners to use a clinical decision-making framework to correlate medical risk to procedural complexity and express the relative risk in terms of the practitioner's comfort and caution levels. The framework then enables the practitioner to make more objective clinical decisions on treatment modification or referral. As with all guidelines of this nature, individual patients must be assessed on their own individual presentations. The risks of treatment must be reassessed at each future encounter. ■

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He's also a dentist.

John Kershman, Dentist, CDA member and community volunteer.

John Kershman loves to bike. And shares his love of biking with others. Every Sunday during the summer, John and a team of volunteers close down a stretch of scenic parkway to be enjoyed solely by bicyclists, young and old. John's also involved in other charitable community ventures. Quite a commitment considering John runs a successful dental practice. But, because he's a CDA member, he can enjoy his volunteer work as much as his career.

CDA is positioned to act on behalf of Canadian dentistry on key issues such as taxation, managed dental care and clinical issues. In 1998, CDA government lobby efforts paid off when employer-sponsored health and dental plan premiums received tax-exempt status, translating into increased access to dental care for more than one million Canadians. CDA has taken a leadership role dealing with the managed care issue, positioning itself as a resource to industry players and dentists with research documents, fact sheets and resource kits. CDA monitors Health Canada regulations affecting dentistry such as fluoride, amalgam, and infection control, ensuring appropriate representation from the dental profession. In short, CDA is there for Canadian dentists.

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CLINICAL PRACTICE



The Buccal Bifurcation Cyst: Is Non-Surgical Treatment an Option?

Lesley A. David, DDS

George K.B. Sándor, MD, DDS, FRCD(C), FRCS(C), FACS

Douglas W. Stoneman, DDS, FRCD(C)

ABSTRACT

The mandibular buccal bifurcation cyst (BBC) was first described by Stoneman and Worth in 1983. It is a lesion with a specific location, classically the buccal surface of the mandibular first molar and less frequently the mandibular second molar. There have been numerous reports in the literature describing the BBC and its treatment. Treatment advocated thus far includes extraction of the involved first molar, marsupialization and enucleation of the cyst. In their most recent article, Pompura, Sándor and Stoneman reported on the successful treatment of 44 cysts with enucleation without tooth extraction. This article will describe the diagnostic features of the BBC and present three cases with a total of five cysts, which were treated non-surgically and ultimately resolved. The authors, therefore, propose that a more conservative non-surgical approach to these lesions may be considered.

MeSH Key Words: mandibular diseases/pathology; molar child; periodontal cyst/pathology.

© J Can Dent Assoc 1998; 64:712-6

This article has been peer reviewed.

Introduction

The buccal bifurcation cyst (BBC) is an uncommon lesion associated with the permanent mandibular first or second molar in children. Usually it is identified just prior to eruption. Stoneman and Worth in 1983 were the first to describe the lesion and report its radiographic and clinical features.¹ They named the lesion mandibular infected buccal cyst. Similar lesions have been described in the literature under a variety of names. They include the circumferential dentigerous cyst,² the inflammatory paradental cyst,³ and the inflammatory collateral dental cyst.⁴ The World Health Organization⁵ describes this lesion under the name "paradental cyst."

Neville, Damm and Allen et al. state that this latter name should be avoided because it is non-specific.⁶ Pompura, Sándor and Stoneman⁷ argue for the term BBC, because the lesion is site- and age-specific. It has a constant relationship to the mandibular first molar's buccal bifurcation (**Table I**).

The radiographic presentation of the BBC may be subtle and easily overlooked unless the lesion is large or symptomatic. If a BBC is suspected, a panoramic or periapical radiograph should be taken as well as an occlusal film (**Fig. 1**).¹ The BBC's distinct radiographic features are listed in **Table II**.

The histology of this lesion is non-specific and reveals non-keratinized stratified squamous

epithelium, areas of epithelial hyperplasia and an inflammatory infiltrate in the connective tissue wall. Bacteriology reports have shown a mixed flora.⁷⁻⁹

The differential diagnosis of this lesion includes eosinophilic granuloma, lateral periodontal cyst, traumatic bone cyst and periostitis ossificans. Usually, the clinical and radiographic features distinguish the BBC from other conditions.⁸

Treatment of the BBC has evolved over time. The low incidence of this lesion makes randomized controlled trials impractical. Stoneman and Worth report successful treatment through tooth extraction and curettage of the lesion, as well as with endodontic treatment of the tooth and

Table I

Clinical Features of the Buccal Bifurcation Cyst

1. Most common in the 6- to 11-year-old age group.
2. Usually associated with the mandibular first molar, occasionally the mandibular second molar.
3. The associated tooth has an altered eruption pattern with buccal tilting of the crown.
4. The associated tooth is vital.
5. Deep periodontal pockets on the buccal aspect of the tooth.
6. +/- swelling.
7. +/- pain or tenderness.
8. +/- infection.

Table II

Radiographic Features of the Buccal Bifurcation Cyst

1. Fine radiopaque concave line as lower limit, producing a U-shaped radiolucent lesion that appears superimposed over the roots.
2. Intact periodontal ligament space and lamina dura.
3. Increased prominence of lingual cusps due to tilting.
4. Apices tilted toward lingual cortex.
5. Intact inferior border of mandible.
6. +/- periosteal reaction on buccal surface.
7. +/- bony expansion, thinning and associated swelling of the buccal cortex.
8. +/- displacement of adjacent unerupted teeth (see Fig. 2a).



Fig. 1: Occlusal radiograph of a buccal bifurcation cyst showing lingual displacement of the first molar roots and the resultant increased prominence of the lingual cusps. Note also the thinning of the buccal cortex and periosteal reaction.

curettage of the lesion.¹ Enucleation and extraction are reported by Trask, Sheller and Morton¹⁰ and more recently by Martinez-Conde, Aguirre and Pindborg.¹¹ Stanback reports treatment via marsupial-

ization.¹² Enucleation alone is reported by several authors.^{8,9,13,14} Pompura, Sándor and Stoneman⁷ recently report the successful treatment of 44 BBCs with enucleation alone (without tooth extrac-

tion). The following cases illustrate an even more conservative approach to treatment.

Cases

Case 1

During an orthodontic consultation, an 8-year-old male was noted to have bilateral cystic lesions of the mandible. He was asymptomatic, but on intraoral examination buccal tilting of the associated teeth and deep buccal periodontal pockets were noted. Mild bilateral swelling was noted extraorally. The lesions were pointed out to the patient and his mother, who were advised to see an oral and maxillofacial surgeon for management.

The family moved away for a year and never sought treatment. At a follow-up visit 15 months later, the lesions showed definite signs of radiographic resolution. Six months after this initial follow-up, there was no clinical or radiographic evidence of the cysts at all (Figs. 2a-2f).

Case 2

A 9-year-old male had BBCs associated with teeth 3.6 and 4.6. These teeth were tilted buccally and were associated with deep buccal periodontal pockets. No treatment was rendered. During nine months of follow-up, the cyst adjacent to tooth 4.6 enlarged and required surgical treatment, and the cyst adjacent to tooth 3.6 regressed without treatment (Figs. 3a-3d).

Case 3

A 7-year-old male was treated by his physician with a course of amoxicillin for pain and swelling of the mandible and was subsequently referred to his dentist. On examination, the patient had swelling and tenderness in the region of the right angle of the mandible. Intraorally, the soft tissues buccal to teeth 3.6 and 4.6 were inflamed and slightly erythematous. Periodontal probing revealed depths of 11 mm to 12 mm buccally. Both crowns were tilted buccally. The pockets were irrigated with saline and hydrogen peroxide and the patient was instructed to irrigate these areas at home daily with saline rinses. The

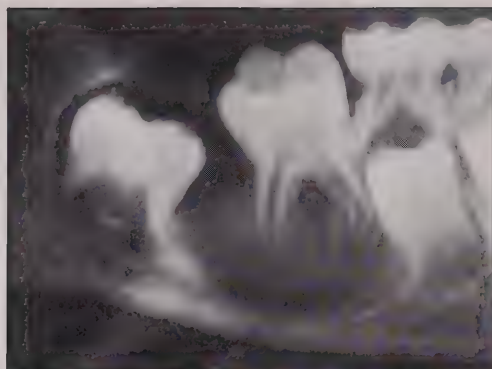


Fig. 2a: Large buccal bifurcation cyst around tooth 4.6.

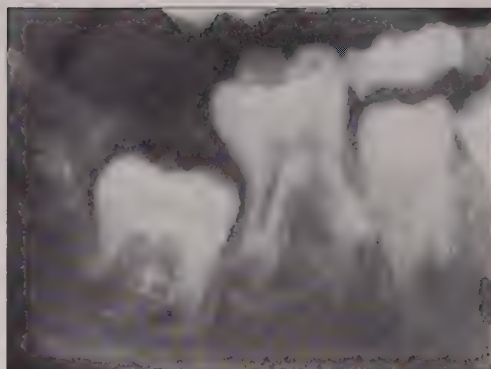


Fig. 2b: Bone fill noted at 15 months without treatment.



Fig. 2c: Complete resolution of cyst with uprighing of tooth 4.6 at 21 months.



Fig. 2d: Lesion around tooth 3.6.



Fig. 2e: Bone fill at 15 months without treatment.



Fig. 2f: Complete resolution of cyst.

patient was reassessed weekly. Over several months, the defects resolved with irrigation and the periodontal status returned to normal. The probing depths were 2 mm to 3 mm buccally, and the patient's pain, swelling and inflammation ceased (Figs. 4a-4d).

Discussion

The etiology of the BBC remains uncertain. Different theo-

ries have been proposed. During eruption, as the cusps penetrate the oral epithelium, a localized area of inflammation may occur beneath the epithelial attachment. The fact that the mesiobuccal cusp of the first molar is the first to break through the epithelium might explain the development of the lesion on the buccal surface at about the time of eruption.¹ The cystic epithelium may be derived

from the cell rests of Serres, the cell rests of Malassez, apical migration of cells of the dental lamina or reduced enamel epithelium.⁷ As Camarda, Pham and Forest⁸ state, however, this explanation does not account for the reason these lesions have not been seen with erupting incisors. Another hypothesis is simply that this cyst is a variant of the lateral periodontal cyst.¹ This lesion is



Fig. 3a: Lesion around tooth 4.6 with faint radiopaque concave line at apices and prominent lingual cusps.



Fig. 3b: Spontaneous enlargement of lesion 9 months later.



Fig. 3c: Lesion around tooth 3.6 with faint radiopaque lines at apices and prominent lingual cusps.

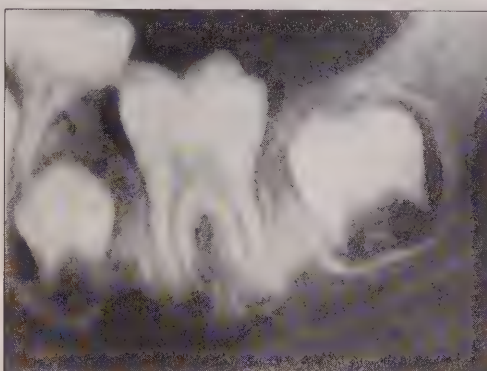


Fig. 3d: Spontaneous bone fill around apices and mesial and distal of tooth 3.6 at 9 months without treatment.



Fig. 4a: Faint radiopaque line at apices and distally around tooth 3.6.



Fig. 4b: Resolution of cyst at tooth 3.6.

also site-specific, namely to the canine and premolar region, and rarely occurs in children.⁷ Enamel projections into the buccal bifurcation may also be a causative factor.

Pompura, Sándor and Stone-man point out that these lesions are not seen in adults and questioned whether they may be

self-limiting.⁷ Evidence from these three patients with five cysts indicates that some of these lesions are self-limiting. The authors speculate that perhaps microtrauma and subsequent inflammation of the buccal gingival tissues and the cyst lining may induce a small opening into the lesion. This

"automarsupialization" may allow the cyst to depressurize and heal spontaneously. Periodontal probing may also result in "micromarsupialization." **Case 2** illustrates simultaneous regression of a lesion on one side and continued growth of a BBC on the contralateral side. Factors that predict

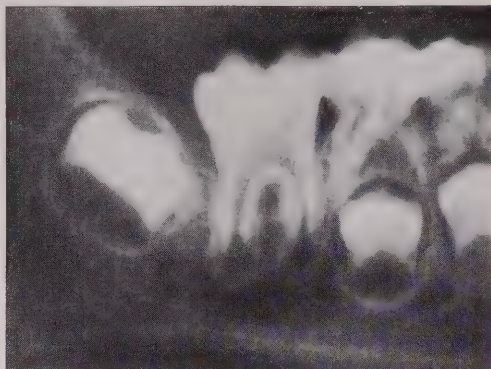


Fig. 4c: Smaller cyst at tooth 4.6; faint radiopaque line at mid apices.

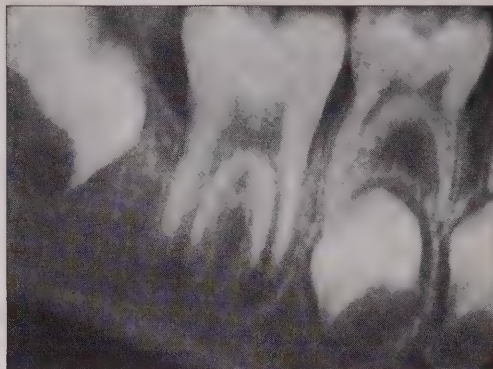


Fig. 4d: Spontaneous healing of cyst at tooth 4.6.

which lesions may be more susceptible to spontaneous resolution are unknown. Although there are no guidelines on which cysts need to be watched and which require surgical treatment, the authors emphasize that at least some BBCs may not require surgery. Consideration should therefore be given to managing BBC cases conservatively with an expectant "watchful inactivity." Clinical and radiographic re-evaluation should occur at three- to six-month intervals. Infected lesions or those increasing in size must be managed surgically. ■

Acknowledgment: the authors thank Dr. M. Dagenais for her radiographic contribution to this paper.

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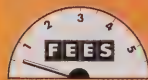
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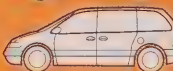
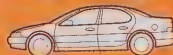
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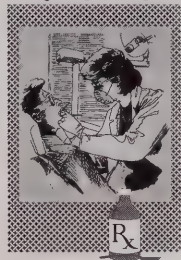
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CLINICAL PRACTICE



La variation inter-dentistes sur le scellement dentaire

(Inter-Dentist Variability In the Provision
Of Fissure Sealants)

Chantal Galarneau, DMD, M.Sc.

Jean-Marc Brodeur, DDS, PhD

ABSTRACT

It has been recognized that the diagnosis and treatment of caries vary so widely among dentists that patients increasingly feel the need to inform themselves and to compare recommended treatments before accepting one. This phenomenon is all the more present in pit and fissure surfaces intervention choices, where there is a wide variety of available treatments.

This article will attempt to highlight the factors explaining the pit and fissure treatment variation. The lack of knowledge on pit and fissure sealant effectiveness and indications as well as dentists' clinical experiences have given rise to different myths and prejudices that have had an impact on the variability of treatment decision making.

When in doubt about the necessity to execute a treatment, each decision to withhold treatment results in an incomplete care episode. A dentist's lack of comfort with withholding treatment may stop him from offering preventive care and cause him to follow a restoration-oriented practice. It is therefore increasingly urgent to achieve agreement among dentists, especially as current knowledge on the subject is giving way to new research.

MeSH Key Words: decision making; pit and fissure sealants.

© J Can Dent Assoc 1998; 64:718-725

This article has been peer reviewed.

Introduction

Est-ce que vos patients magasinent leurs traitements? Combien de fois avez-vous entendu : «Docteur, j'ai vu un autre dentiste qui m'a dit que j'avais beaucoup plus de caries que ce que vous me dites»? Ou encore, la situation inverse où vous dites à un patient qu'il a plusieurs caries, et qu'un autre dentiste lui a dit que tout est beau. Ce genre de circonstances peut mettre dans l'embarras plus d'un dentiste, surtout lorsqu'il est confiant d'avoir fait un diagnostic de carie adéquat. Comment se justifier devant un tel patient qui semble

remettre en question votre compétence, alors que la réponse n'est pas du tout évidente? Le manque de concordance repose principalement sur les différentes philosophies de traitement qui existent parmi les dentistes. Dans le passé, la forte prévalence de la carie, la progression rapide des lésions carieuses et le fait que le public était peu sensibilisé à l'importance de la santé dentaire ont donné naissance à la philosophie de traitement suivante : «Dans le doute, on obture». Selon cette approche, que l'on qualifie de curative, il est nécessaire de restaurer toutes les régions d'une dent ayant une forte susceptibilité de développer à long terme

une carie dentaire, de même que de restaurer toute carie existante afin d'empêcher sa progression.

Cependant, au Québec, nous assistons présentement à des changements comme la diminution de la prévalence de la carie chez les enfants, la diminution de la vitesse de progression des lésions carieuses et une prise de conscience du public quant aux moyens disponibles pour améliorer leur santé bucco-dentaire. Ces circonstances ont fait naître une nouvelle approche, la philosophie préventive, qui se résume ainsi : «Dans le doute, on applique des

Tableau I

Étude sur la variation inter-dentistes

Étude (source)	Type de dents	Genre d'examen	Nombre de dentistes	Nombre de décisions	Genre de décision	Intervalle de décisions positives
Lewis, Kay et al. ¹¹	dents extraites	radiologique	17	304	- restauration - présence de carie - carie/émail - carie/JED - carie/dentine	2%-45% 9%-82% 5%-40% 0%-9% 2%-33%
Espelid ⁷	dents extraites	radiologique (occlusal)	243	68	- restauration - surface saine - décoloration - petite cavité - grosse cavité	0%-45% 0%-33% 0%-58% 0%-90%
Noar et Smith ⁴	dents extraites	clinique et radiologique	86	48	- présence de carie (clin.) - présence de carie (radio.) - restauration (clinique) - restauration (radio.)	6%-69% 15%-75% 0%-46% 6%-50%
Kay, Watts et al. ³	dents extraites	clinique (occlusal)	10	30	- restauration - agent de scellement - restauration/agent de scellement	20%-90% 0%-63% 47%-90%

mesures préventives et on garde un suivi¹. En résumé, elle consiste principalement à tenter de reminéraliser une lésion carieuse débutante tout en sachant qu'il existe un risque potentiel de progression, en plus de garder un contrôle préventif sur les régions à forte susceptibilité. Ainsi, ces deux philosophies de traitement engendrent des différences d'opinions qui se répercutent sur le nombre de dents à restaurer, et conséquemment sur la confiance des patients.

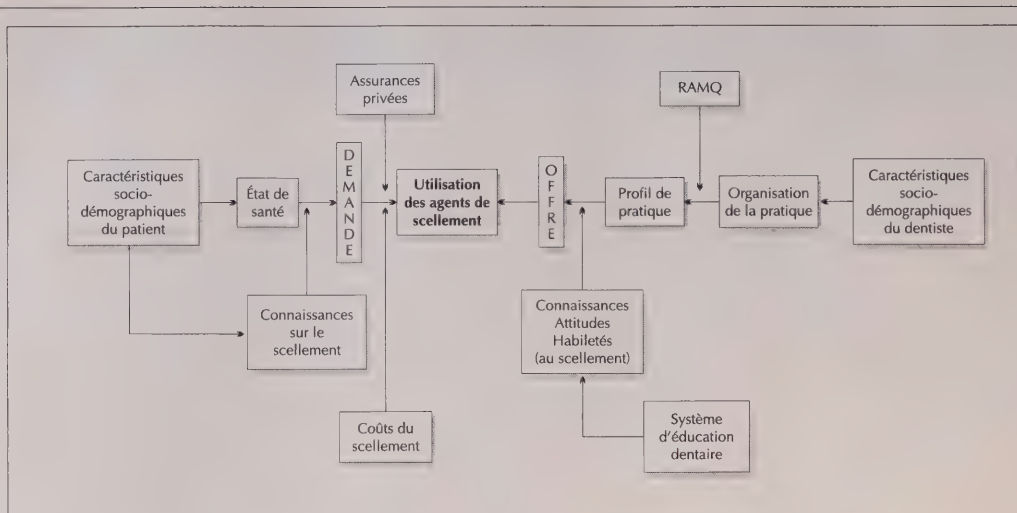
Ce genre d'expérience nous fait prendre conscience qu'il est urgent d'obtenir un certain consensus au sein de la profession dentaire car, de plus en plus par sentiment de doute, les patients s'informent, comparent et veulent connaître les différentes solutions qui s'offrent à eux. Le temps où le dentiste était le seul à prendre les décisions concernant la santé dentaire de ses patients est terminé. De plus, la confiance totale qu'on accordait, à cette époque, aux professionnels de la santé dentaire est révolue. Ce réveil peut s'expliquer pour le moins par les médias qui, de nos jours, n'hésitent plus à mettre en lumière les cas de

fraude, de négligence professionnelle et de discordance parmi les dentistes. D'ailleurs, le débat sur le mercure contenu dans l'amalgame dentaire représente actuellement un bon exemple à citer puisqu'il crée, jusqu'à maintenant, un climat d'ambiguïté et d'insécurité pour le patient.

Le phénomène de variation

Chez les dentistes, il existe, en réalité, une telle variation dans le diagnostic de la carie et dans les décisions de traitement proposés, qu'il serait avantageux pour la profession d'y chercher une solution. On trouve dans la littérature plusieurs études qui ont démontré cette variation²⁻¹¹. Le **Tableau I** présente un résumé de quelques-unes de ces études. Lewis, Kay et al.¹¹ ont demandé à 17 dentistes de procéder à un examen radiologique de 304 surfaces dentaires, où chacun devait se prononcer sur la présence de carie de même que sur la nécessité d'obturer, et ce, pour chacune des surfaces examinées. D'après les résultats, on remarque qu'un des 17 dentistes aurait fait un diagnostic positif de carie pour seulement 9 % des 304 surfaces, alors qu'un autre aurait

trouvé une présence de carie sur 82 % de ces mêmes surfaces. De plus, ces deux mêmes dentistes auraient restauré respectivement 2 % et 45 % des 304 surfaces. Dans l'étude d'Espelid⁷, les chercheurs ont comparé les différentes propositions de restauration pour les surfaces saines, celles présentant de la coloration et celles avec une petite ou grande cavité. Il s'agissait d'un examen radiologique de 68 surfaces non proximales effectué par 243 dentistes. On peut voir qu'un des dentistes n'aurait restauré aucune des surfaces saines, et qu'un autre en aurait restauré 45 %. Mêmes résultats pour les surfaces présentant une grosse cavité, où on retrouve un intervalle de décision de traitement qui varie entre 0 % et 90 %. Noar et Smith⁴ ont évalué la présence de carie et le besoin de restauration à l'aide d'un examen à la fois clinique et radiologique de 48 surfaces, exécuté par 86 dentistes. Ils ont trouvé des variations de l'ordre de 6 % à 75 % pour la présence de carie et de 0 % à 50 % pour le besoin d'obturation. Quant à Kay, Watts et al.³, ils ont évalué le nombre de décisions positives relatives à la restauration



III. 1 : Modèle conceptuel de l'utilisation des agents de scellement

et au scellement de 10 dentistes par le biais d'un examen clinique de 30 surfaces occlusales. Un des 10 dentistes aurait restauré 20 % des surfaces, alors qu'un autre en aurait restauré 90 %. Pour le scellement dentaire, les décisions de traitement varient entre 0 % et 63 % pour l'ensemble des 30 surfaces.

Ainsi, le phénomène de variation est aussi présent chez les dentistes quand il s'agit de faire un choix d'intervention à l'égard des surfaces avec puits et fissures. Brownbill et Setcos¹² ont choisi, pour leur étude, 10 régions distinctes de dents contenant un puits ou une fissure qu'ils ont fait analyser par 20 dentistes, et pour lesquelles ceux-ci ont dû choisir un traitement donné. Encore une fois, on y retrouve beaucoup de variation, d'autant plus qu'il existe une grande variété de traitements possibles pour les surfaces avec puits et fissures. Pour l'ensemble des régions, 21 décisions sur 200 (20 dentistes ayant pris chacun 10 décisions) auraient été en faveur de ne rien faire, 3 d'appliquer des fluoroformes, 1 de polir la surface, 6 de faire un verre ionomère scellant, 50 une résine scellante, 39 une restauration conservatrice en résine composite (RCRC), 2 un verre ionomère de restauration, 7 une aurification, 58 un amalgame,

13 un composite postérieur et 0 une couronne. En tout, les décisions d'intervention sont plutôt réparties à travers la diversité des choix proposés, favorisant, toutefois, plus particulièrement l'amalgame (29 %), ensuite le scellement dentaire (25 %) et, en troisième lieu, les RCRC (19,5 %).

On peut aussi s'interroger sur la faible prévalence des agents de scellement de puits et fissures au Québec, d'autant plus que la carie de puits et fissures représente 70 % à 90 % de l'ensemble de la carie sur les dents permanentes¹³. En 1990, on établissait que seulement 8 % à 10 %¹³ des enfants du Québec étaient porteurs d'agents de scellement. Cette faible proportion d'enfants qui en bénéficient nous porte à penser que, contrairement aux dentistes des États-Unis¹⁴, les dentistes du Québec privilégient l'amalgame aux agents de scellement. L'utilisation des agents de scellement dépend des facteurs liés à l'offre et à la demande (III. 1). D'une part, l'offre se fait par le biais du professionnel, c'est-à-dire par :

1. ses caractéristiques socio-démographiques (âge, sexe, année d'obtention du diplôme, etc.) et personnelles (connaissances, habiletés, éducation dentaire);

2. l'organisation de sa pratique (pratique de groupe ou en solo etc.);

3. le profil (préventif vs curatif) de sa pratique.

D'autre part, la demande exprimée par le patient dépend des différents attributs qui le caractérisent : ses caractéristiques socio-démographiques (éducation, revenu familial, etc.), y compris la possession d'assurances dentaires privées familiales, son état de santé, de même que ses diverses connaissances sur le scellement dentaire.

L'absence de couverture des soins préventifs par la Régie de l'assurance-maladie du Québec (RAMQ) peut aussi avoir un impact important sur la faible prévalence des agents de scellement au Québec. Les parents peuvent manifester une certaine réticence à utiliser des agents de scellement, voire même les refuser catégoriquement, puisque les frais encourus par cette technique représentent un coût de 19 \$ cdn¹⁵ par dent scellée. Quant au professionnel dentaire, il peut être moins tenté de proposer des agents de scellement pour la simple raison qu'ils ne sont pas couverts, et parce qu'il est souvent confronté à un refus de la part des parents.

Des connaissances qui diffèrent sur l'efficacité

Les dentistes sont tous conscients que la mise en marché de nouveaux matériaux, de même que le perfectionnement de certains, font naître différents traitements possibles. Cependant, une telle diversité rend le choix du traitement à recommander de plus en plus difficile pour le dentiste, puisque les résultats comparatifs de ces différentes techniques en rapport avec certaines situations cliniques ne sont pas connus. C'est le cas, par exemple, de la dentisterie opératoire qui représente un grand pourcentage des services offerts dans la pratique quotidienne des dentistes généralistes, et pour laquelle les résultats des diverses restaurations possibles sont très peu connus. Bader et al.¹⁶ cite un exemple communément rencontré en Amérique du Nord : le dilemme entre une grosse restauration en amalgame et une couronne. Lequel des traitements serait à privilégier sachant que le patient peut assumer l'une ou l'autre des dépenses? Bien des dentistes, de par leur formation, auraient tendance à considérer la couronne comme un traitement de qualité supérieure à l'amalgame. Toutefois, aucune étude clinique, ayant analysé la durée de vie de ces deux procédures, n'est disponible pour appuyer cette croyance. En conséquence, on peut s'attendre à ce que les croyances personnelles de même que le manque d'information objective concernant les différents traitements possibles aient pour résultat d'augmenter la variation dans le choix de traitements proposés.

En guise de solution, la littérature scientifique s'interroge depuis quelques années sur le besoin de créer des guides d'intervention pour la dentisterie, comme il a été fait pour le domaine médical. Ces guides d'intervention font le point sur les divers traitements possibles pour une condition clinique spécifique, et ont pour but d'assister le professionnel et le patient à choisir les soins les plus appropriés¹⁷. Ces guides devraient favoriser la stan-

dardisation des différentes propositions et décisions de traitement.

Le scellement des puits et fissures représente la procédure dentaire où les résultats à long terme et les connaissances des professionnels à leur égard ont été les plus étudiés. Certains critères directifs ont même été établis pour guider le professionnel dans son choix d'intervention. Ainsi, l'efficacité des agents de scellement ne fait présentement aucun doute. Elle a été fortement documentée dans la littérature par plusieurs études cliniques que l'on retrouve sous forme de synthèse dans un article de Ripa¹⁸. À l'origine, l'efficacité des agents de scellement était évaluée par des études cliniques qui comparaient le taux d'inhibition de la carie des dents scellées à d'autres dents de la même bouche n'ayant pas reçu d'agents de scellement. Cependant, il n'est plus éthique de procéder à de telles études depuis que, en 1976, l'Association dentaire canadienne a reconnu officiellement le produit. Le critère de succès de l'efficacité du scellement est alors devenu le taux de rétention, découlant de la logique qui veut qu'un agent de scellement prévienne la carie dentaire tant et aussi longtemps qu'il reste bien en place sur la dent.

Ripa¹⁹ a pu démontrer que les agents de scellement de seconde génération (autopolymérisable) ont une rétention supérieure à celle de la première génération (ultraviolet) et qu'ils apportent donc une meilleure protection contre la carie dentaire. Après 7 ans, 66 % des dents scellées par des agents de deuxième génération présentaient encore un scellement complet de leurs puits et fissures, alors qu'on retrouvait un taux de 31 % pour la première génération. D'autres études¹⁸, échelonnées sur une période de 10 ans, ont trouvé des pourcentages de rétention complète de l'ordre de 41 % et 57 % pour la deuxième génération d'agents de scellement. La troisième génération (photopolymérisable) semble indiquer un taux de rétention similaire à ceux de la deuxième.

Cependant, cette affirmation est basée sur des études dont la période d'observation ne dépasse pas 5 ans. Il faut être conscient que ces agents de scellement sont encore nouvellement arrivés sur le marché, mais que les résultats des études réalisées jusqu'à maintenant sont prometteurs.

Un tel volume d'information devrait avoir comme conséquence de diminuer l'incertitude et la variation dans les décisions de scellement. Toutefois, tel n'est pas le cas car il existe, chez les dentistes, beaucoup de variations quant à leurs connaissances et à leurs croyances sur l'efficacité des agents de scellement, bien que celle-ci ait été reconnue scientifiquement. Est-ce alors une question d'accessibilité à l'information? Celle-ci existe dans la littérature sous forme d'articles ou de monographies, mais encore faut-il savoir qu'elle existe. Deux guides d'intervention sont présentement à la disposition des professionnels de la santé dentaire. Un premier a été publié en 1986 par le département de santé publique du Massachusetts sous forme de petit volume²⁰ et un deuxième, récemment publié en 1995, est disponible dans le *Journal of Public Health Dentistry* sous forme d'articles²¹. Il serait avantageux de considérer la possibilité d'utiliser ce genre de guide dans la formation universitaire de premier cycle et continue des dentistes, de manière à ce que cette information puisse être plus facilement accessible à tous.

Des connaissances qui diffèrent sur l'utilisation appropriée des scellements

Depuis la publication du guide d'utilisation des agents de scellement de 1986, on a assisté à une émergence de faits nouveaux concernant l'épidémiologie de la carie, ces caractéristiques cliniques, les seuils probables de reminéralisation d'une lésion carieuse, les techniques de diagnostic et les différentes options de traitement conservateur. Toute cette information a eu comme

résultat de créer un climat d'incertitude. À cette époque les critères décisionnels pour le scellement dentaire, suggérés dans le guide de pratique et enseignés dans les universités, n'étaient pas assez explicites et rigoureux et ont entraîné diverses croyances, mythes ou préjugés à l'égard des agents de scellement.

Un des préjugés les plus fréquemment cités est la crainte de sceller une carie qui puisse progresser. Quelques chercheurs²²⁻²⁹ se sont intéressés au danger de progression d'une lésion carieuse débutante (dans l'émail) et ont pu démontrer qu'il n'existe aucune évolution de la carie sur les dents dont l'agent de scellement est encore intact après 1 an, 2 ans, 5 ans et même 6 ans. Mertz-Fairhurst, Schuster et al.²⁸ ont même suggéré qu'il est possible d'arrêter le processus carieux d'une lésion ayant légèrement dépassé la jon-

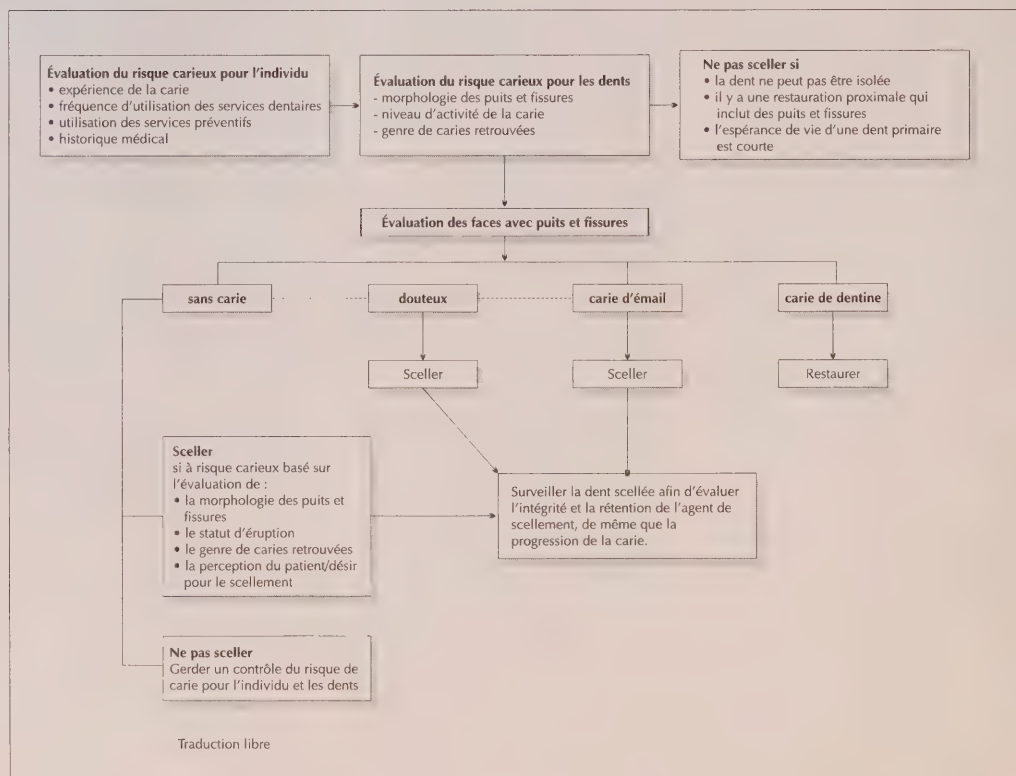
tion énamo-dentinaire par l'application d'un agent de scellement.

La nécessité éventuelle d'obtenir les faces proximales d'une dent scellée est aussi un mythe qui a engendré une fréquente remise en question de la pertinence des agents de scellement. Les études épidémiologiques chez les enfants du Québec montrent pourtant que la carie des faces lisses est très peu prévalante en comparaison à la carie de puits et fissures : 10 % à 30 % contre 70 % à 90 % respectivement¹³.

La possibilité que le mordancage puisse diminuer la résistance de l'émail à l'attaque carieuse est le troisième mythe véhiculé. Selon Silverstone³⁰ de même que Albert et al.³¹, l'émail mordancé reprend son apparence et sa solubilité normale après 2 à 3 jours. Le risque d'attaque par la carie n'est donc pas affecté, même s'il y avait perte ou fracture de l'agent de scellement. La recom-

mandation qui dit qu'un agent de scellement devrait être appliqué dans les quatre années suivant l'éruption de la dent, sous prétexte qu'une dent encore saine après cette période d'exposition n'est plus vraiment à risque de carie, a aussi fait l'objet d'études. Celles-ci³²⁻³⁴ ont pu démentir cette affirmation en établissant que la carie de puits et fissures se poursuit également durant l'adolescence de même qu'à l'âge adulte.

Ces différentes interrogations et préoccupations à l'égard des agents de scellement ont motivé la création du guide de pratique de 1995 (III. 2) : il s'agit d'une mise à jour ou d'un raffinement du guide de 1986, mais est toutefois complémentaire à ce premier. On peut y noter quelques changements apportés dans les critères décisionnels. En effet, en 1995, l'évaluation du risque potentiel de carie devient une considération fondamentale dans le choix de



III. 2 : Critères décisionnels du guide d'intervention pour les agents de scellement de 1995

scellement, et ce, à deux niveaux principaux : celui de l'individu et celui de la dent. De plus, dans cette nouvelle version, on recommande et insiste tout particulièrement sur le fait qu'on puisse sceller une carie d'émail et entraîner ainsi l'arrêt de la lésion et non pas sa progression. On parle alors d'agent de scellement thérapeutique. On suggère également de restaurer la carie de dentine de façon conservatrice, par exemple, par des restaurations de type RCRC. L'importance qu'on accordait à l'atteinte des surfaces proximales a aussi diminué puisque de nouveaux matériaux, qui permettent de traiter les surfaces proximales et occlusales indépendamment les unes des autres, font maintenant partie des matériaux restaurateurs qui sont disponibles sur le marché. Finalement, il y est bien précisé que l'âge post-éruptif de la dent n'est plus utilisé officiellement comme critère décisionnel de scellement, et ce, basé sur des données cliniques et épidémiologiques.

Chez les dentistes utilisateurs de cette mesure préventive, on retrouve même une variation dans les propositions de scellement. Cette variation s'exprime, ici, plutôt en termes de fréquence d'utilisation. Jusqu'à quel point doit-on sceller? Certains dentistes décident de sceller après avoir évalué le risque potentiel de carie du patient, alors que d'autres scellent toutes les fissures réténives peu importe l'âge du patient et son historique de carie. Pour eux, il s'agit d'une approche préventive dont tous les patients peuvent bénéficier²¹. Les études sur le rapport coût/avantage des agents de scellement suggèrent, au contraire, de cibler cette intervention aux sujets les plus susceptibles à la carie³⁵.

Des expériences cliniques différentes

Cette variation peut aussi s'expliquer par de mauvaises expériences cliniques vécues. Ces expériences ont pu provoquer chez les professionnels dentaires

une remise en question de l'efficacité des agents de scellement, de leur rétention de même que de leur durabilité comparativement aux amalgames. Plusieurs préjugés, mythes ou croyances à l'égard des agents de scellement de puits et fissures y sont encore une fois nés, ayant pour résultat de répartir la population de dentistes entre les utilisateurs réguliers et les utilisateurs occasionnels.

Un des principaux préjugés vient du fait que l'on mesure, depuis quelques années, le succès ou l'efficacité des agents de scellement par leur rétention à long terme, plutôt que par leur capacité d'inhibition de la carie. Lors de la mise en marché des agents de scellement de la première génération (ultraviolet), de nombreux dentistes ont vécu de mauvaises expériences cliniques reliées à leur faible taux de rétention. Même si les agents de scellement de deuxième et troisième générations ont démontré une nette amélioration de leur rétention à long terme, des affirmations comme «Ça ne vaut pas la peine de poser des agents de scellement, car ça ne fait que tomber» sont encore véhiculées.

L'efficacité des agents de scellement a souvent été comparée à celle de l'amalgame. Ce type d'évaluation est cependant discutable, selon Kandelman³⁶, puisque les agents de scellement constituent une mesure préventive, alors que les amalgames correspondent à une technique de restauration. Le scellement a comme avantage de conserver l'intégrité de la structure dentaire, comparativement à la restauration en amalgame qui est une intervention curative nécessitant l'ablation d'une partie des tissus de la dent. Néanmoins, Ripa¹⁸ rapporte qu'environ 60 % des agents de scellement (deuxième génération) étudiés présentaient toujours une rétention complète après 7 à 10 ans, alors que la durée de vie de l'amalgame dentaire se situe, selon certains auteurs^{37,38}, entre 5 et 10 ans pour 50 % des amalgames étudiés et pour d'autres à une durée de vie médiane estimée entre 10 et 14 ans³⁹. Ces résultats sur l'amalgame

proviennent d'anciennes études; or il est important de souligner que les nouveaux amalgames dentaires mis sur le marché pourraient avoir une meilleure longévité reliée à leurs propriétés améliorées.

Faut-il traiter ou s'abstenir?

L'abstention de traitement peut susciter un sentiment d'inconfort qui varie d'un dentiste à l'autre et peut influencer sur les différents choix d'interventions. Autrement dit, certains dentistes sont tout à fait à l'aise de laisser des caries débutantes sous observation, alors que d'autres ne peuvent tolérer de laisser dans la nature des patients en situation de déminéralisation-reminéralisation. Cet inconfort occasionné par l'abstention de traitement s'explique principalement par la peur qu'une carie puisse progresser rapidement, pouvant ainsi engendrer un mécontentement du patient, voire même une poursuite judiciaire. Selon Bader⁴⁰, un dentiste qui possède une faible capacité à gérer un tel sentiment serait plus porté à recommander une restauration lorsqu'une dent présente un doute de carie. En d'autres termes, la tentation de restaurer vient plutôt du fait que ce comportement permet d'éviter, tout simplement, l'anxiété associée à une intervention non curative. En fait, une attitude logique par rapport au dicton «Dans le doute, on obture» qui nous a toujours été enseigné et qui s'est d'ailleurs répandu à travers la profession.

Plusieurs autres facteurs pourraient aussi influencer le comportement du dentiste quand il s'agit de faire un choix d'intervention. On peut supposer qu'un dentiste qui a plus de temps à consacrer à ses patients serait plus confortable de s'abstenir de restaurer, puisqu'il aurait pris le temps de leur expliquer les avantages et les inconvénients de la procédure. Le sentiment d'inconfort engendré par l'abstention de traitement pourrait être apaisé par l'expérience et une clientèle bien établie. De plus, il ne faut pas oublier que la décision de recommander l'application d'un agent de scellement se prend

souvent dans des situations où le diagnostic de la carie est douteux; ce qui fondamentalement fait référence à la capacité de gérer ce sentiment. Le besoin de s'identifier au genre de pratique des autres dentistes, par sentiment de sécurité, est un troisième facteur qui peut aussi nuire à la remise en question des traditions.

Conclusion

La variation inter-dentistes sur le scellement dentaire s'explique en partie par les différentes connaissances des professionnels sur l'efficacité et les indications des agents de scellement, les expériences cliniques qui diffèrent et la capacité de gérer le sentiment d'inconfort associé à l'abstention de traitement. Cette situation laisse place à d'autres études et recherches. Dans un premier temps, il convient d'évaluer la possibilité d'implanter des guides d'intervention comme solution potentielle efficace à la variation qui prévaut présentement chez les dentistes. Deuxièmement, il faut effectuer des études pouvant permettre de raffiner les critères de diagnostic de la carie, de manière à augmenter la concordance entre les dentistes quant à la présence et au stade d'évolution de la carie. Finalement, il faut entreprendre des recherches sur un aspect de la dentisterie, encore peu développé, qui concerne les différents facteurs pouvant influencer ou motiver le comportement préventif des professionnels de la santé buccale. ■

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Journal

November
1998
Vol. 64
No. 10

PROFESSIONAL ISSUES



Quality Assurance In the Dental Profession

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ABSTRACT

The dental profession has traditionally attempted to ensure quality and to guarantee high educational standards by restricting licensure. Recently, many factors have increased public and government interest in the quality of care provided by health professionals. A framework for understanding quality assurance is presented. This framework incorporates with Donabedian's dimensions of structure, process and outcome the additional dimensions of system capacity and community. All dimensions of quality are assessed by comparison with an accepted standard. Quality assurance can be considered as occurring at a system level, a managerial level, and a practice level. All quality assurance activities work to fulfil society's requirements to maintain self-governing professional status.

MeSH Key Words: dental care/standards; dentistry/trends; quality assurance, health care.

© J Can Dent Assoc 1998; 64:726-31

This article has been peer reviewed.

Introduction

Providing excellent dental care has long been a goal of the dental profession. Early achievements in ensuring the quality of dental care include the elimination of proprietary dental schools and the introduction of examination and licensure.¹ More recently, mandatory continuing education has been implemented as a requirement to maintain licensure. Despite these and other successes within dentistry, the public and elected officials have recently taken an interest in the quality of dental care. Although these interest groups differ in their motives, the result is increased pressure on the dental profession to ensure the public is provided with quality health care.² More than ever, den-

tistry's leaders, program managers, and private practitioners need to understand the terminology, rationale, and methods of quality assurance in health care.

Current Interest In Quality Assessment

Rapidly expanding expenditures have led to efforts to contain health care costs in both medicine and dentistry.³ Employers demand information about the performance of the health care plans they purchase for their employees.⁴ Consumerism, a movement aimed at increasing the public's role in decision making in the economy, has risen in North America.⁵

Interest in quality assurance has also been generated by rapid technological advances and increased awareness of variations in aspects of

dental practice, such as the removal of asymptomatic third molars and appropriate recall intervals.⁶ Combined, these factors have resulted in societal pressure for more control of the quality of care provided by all health professionals.⁷

The Requirements Of a Profession

Society has granted professional status to the practice of dentistry in many developed countries.⁸ The characterizing criteria of a profession include: a substantial body of knowledge that must be kept up to date; self-regulation of member selection and discipline; and a self-determined code of ethics (or guidelines) for professional conduct.⁸ All quality assurance activities can be viewed as satisfying some of these criteria.

Table I
Examples Of Elements That Can Be Assessed Under the Structure, Process, and Outcome Approach When Supplemented With Consideration Of Capacity and Community

Capacity	Structure	Process	Outcome	Community
Economic development	Facilities setting	Management practice	Patient satisfaction	Population coverage
Available resources	physical structure	personnel	Oral health status	utilization
society	layout	patient	oral hygiene	accessibility
health care	amenities	Records	tooth loss	equity
dental programs	access	content	periodontitis	equality
Commitment of decision makers	Equipment	completeness	Completion of treatment	Coordination and continuity
	operatories	availability	timely	
	instruments	legibility	appropriate	
	supplies	Diagnosis	Recall pattern	
	sterilization	appropriate	frequency	
	Personnel	documentation	needs at recall	
	appropriate training	thoroughness		
	licensure	Treatment Plan		
	certification	written		
	Administration	sequencing		
	procedures	appropriate		
	record systems	Treatment		
	protocols	appropriate		
		timeliness		

Adapted from: Burt BA, Eklund SA. *Dentistry, Dental Practice, and the Community*. 4th Edition. WB Saunders Company. Toronto: 1992.

The Terminology Of Quality Assurance

Before discussing the processes of quality assurance, it is important to establish a common terminology.

- Quality of care*: refers to the degree to which patient care services increase the probability of desired patient outcomes and reduce the probability of undesired outcomes, given the current state of knowledge.⁹
- Quality assessment*: involves measuring the level of quality provided at some time; it connotes no effort to change or improve the level of care.¹⁰
- Quality assurance*: is the measurement of health care activities and outcomes to determine if current minimum standards are being achieved. If standards are not being met, an action plan is created to ensure future achievement. The desired results of quality assurance are better patient outcomes and/or enhanced resource utilization.⁹⁻¹²

The Comparison Standard

Implicit in quality assessment is the concept that quality is

relative;⁵ what is considered acceptable changes with time and circumstance. However, in all cases, quality is assessed by comparison with an accepted standard, deemed appropriate for the situation. Historically, the comparative standard has been "what any reasonably prudent practitioner from that area would have done under similar circumstances."¹³ Increased public and government interest in the quality of health care have now rendered this standard inadequate. Today, the dental profession is developing clinical practice guidelines and standards of care as strategies to ensure quality in the provision of dental services.¹⁴

A standard is defined in the Gage Canadian Dictionary as "1. anything taken as a basis of comparison; model. 2. a rule, test, or requirement."¹⁵ In Ontario, the 1994 Regulated Health Professions Act requires all health professions to develop and maintain appropriate standards of practice.¹⁶

As a step toward issuing standards of practice, the Royal College of Dental Surgeons of Ontario (RCDSO) is currently developing clinical practice guidelines that

will be published and distributed to dentists. These guidelines will effectively become the standards for use by the RCDSO in assessing the quality of dental services rendered in Ontario.²

Comparison standards from different sources can be used for quality assurance. Appropriate sources include: a) society, as in the case of sexual misconduct; b) the dental profession, as in the case of clinical practice guidelines and professional standards; and, c) management, as in the case of program manuals and job descriptions in a direct service program.

The Dimensions Of Quality Assessment

Donabedian suggests that three dimensions need to be assessed when considering the quality of health care: structure, process, and outcome.¹⁷

Although treatment outcomes may be the ultimate measure of quality, they can be difficult and expensive to assess on a routine basis. Donabedian's model assumes that a desirable outcome is much more likely if the structural aspects of the health care setting (e.g. proper facilities and equip-

ment) and the processes used in providing the care (e.g. treatment planning and record keeping) meet adequate standards.¹⁸ Much of contemporary quality assessment is based on this model.

Although it provides a useful starting point for quality assurance, Donabedian's model is deficient in two aspects. First, it does not consider the *capacity of the system* being assessed. For example, what might be considered acceptable treatment in a developing country may not meet the standards expected in a large Canadian city.¹⁹ Different resource availability results in different capacities to provide health care services, yet the management of quality is appropriate in both settings.

Secondly, Donabedian's model does not consider the *community as a whole* in its assessment. From this public health perspective, it would be difficult to rate the quality of dental treatment as excellent in a community where two indi-

viduals obtained crowns of perfect technical quality while many others went without basic restorative treatment. Similarly, if an amalgam filling could have been avoided through the timely application of preventive fluorides, it is difficult to consider it as being good quality treatment, even if the restoration is technically perfect.

To address the shortcomings of Donabedian's approach, I propose a new model for use in assessing the quality of health care. This model incorporates the assessment of structure, process, and outcome with the assessment of two new dimensions: the community and system capacity (see Table I).²⁰⁻²²

Models For Ensuring Quality

Donabedian said that the purpose of quality assurance is "to identify and correct the most serious failures in care and, by doing so, to create an environment of watchful concern that motivates everyone to perform better."²³ This

traditional approach to quality assurance takes on a problem-oriented focus analogous to police work.²⁴ It can be thought of as the "theory of bad apples," with subscribers believing that quality is best achieved by identifying outliers and removing them from the basket. The problem with the "bad apple" approach is that the efforts are concentrated on that small proportion of practitioners providing inadequate care. It does nothing to directly address or try to improve the quality of care provided by the majority of practitioners.

The more contemporary models for ensuring quality are known as "continuous quality improvement" (CQI) or "total quality management" (TQM). These models are based on a philosophy of management that aims to help organizations improve performance by eliminating poor quality during production and delivery rather than after the product or service is completed.²⁵

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Quality Assurance In Dentistry

Quality assurance protects and enhances quality through system design and performance monitoring. For example, formal monitoring in direct dental service programs (e.g. Ontario's CINOT program) is conducted when public health dentists: a) systematically collect information regarding the structure, process and outcome of direct service activities (e.g. daily staff activities and dentist claims); b) identify patterns of practice (e.g. by comparison to a standard or average); c) explain these patterns; d) take action to correct deficiencies;

and e) verify the effects of remedial actions.²⁶

Quality assurance activities in organized dentistry can be considered as occurring at three different levels: a system or profession level, a management or administrative level, and a practice level. The first two levels will be considered in more detail. The many methods of quality assurance in private practice are the topic for a separate paper.

System Or Profession Level Quality Assurance

Organized dentistry has many methods in place for ensuring that

the quality of dental care is maintained.

Admission into dental school is controlled by the profession's leaders in a manner that ensures the acceptance of highly qualified individuals.

Dental education involves a four- or five-year program that ensures dentists are well educated on completion of their undergraduate program.

Canadian dental schools must be accredited, with graduation from an accredited facility necessary for licensure.

Dentists must be licensed in order to practise in Canada and must meet standards to obtain and maintain licensure.

Peer review is one of four phases in a new quality assurance program being developed by the RCDSO. This initiative mirrors the Peer Assessment Program of the College of Physicians and Surgeons of Ontario, which uses mandatory, regular assessments of a stratified random sample of physicians in office-based practices to identify those whose performance is unacceptable.²⁷

Due to the monetary and potential psychological costs of evaluating outcomes, the practice assessment tools developed by dental organizations tend to focus on the process of care. Examples of process assessment systems include the "Development of Evaluation Methods and Computer Applications in Dentistry" (DEM-CAD),²⁸ which was funded by the Kellogg Foundation in 1982, and the RCDSO Dental Practice Review. Research has shown that the use of an abbreviated process assessment can identify most problematic offices.²⁹

Mandatory continuing education (MCE) is a requirement for license renewal in some jurisdictions. In Ontario, failure to obtain the necessary credits may lead to an "automatic" practice review. This requirement helps all licensed practitioners in the province to stay current, in terms of professional knowledge.

Table II

Understanding Quality Assurance Activities By Revisiting the Requirements For Professional Status

Requirements Of a Profession				
	Large Body of Knowledge	Member		Code of Ethics & Guidelines of Conduct
		Selection	Discipline	
System Level				
admission		•		
training	•			
accreditation	•			
licensure - NDB	•	•		
mandatory CE	•		•	
Management Level				
report cards	•		•	•
MIS surveillance			•	•
practice profiling			•	•
chart audits			•	•
performance appraisal			•	•
peer review			•	•
patient review			•	•
dentist enhancement	•		•	•
licence suspension			•	•
Practice Level				
checklists				•
guidelines in chart				•
staff meetings	•		•	•
self-assessment	•			•
continuing education	•			
journal subscription	•			
society membership	•			•

Management Or Administrative Level Quality Assurance

Ensuring quality is an important facet of management in dentistry. Quality reviews must be built into the planning process to ensure systematic consideration. Such reviews can be prospective, concurrent, or retrospective depending on whether they occur before, during or after service is provided.

a) Example Of Prospective Review

i) Predetermination

Predetermination involves a pretreatment review of the suggested treatment. It typically includes a review of treatment plans, pretreatment radiographs, and letters of expertise for certain identified dental procedures (e.g. crowns). The reviewer makes judgments on the necessity and appropriateness of care, both of which are important aspects of quality.⁵

b) Examples of Concurrent Review

i) Site Visits

In a public health dental clinic, the public health dentist visits the site of service delivery to assess the structure, process, and outcome of care provided by a staff member. Every aspect of patient care can be compared with professional standards or program policy expectations. In some circumstances, direct patient examinations, before and after treatment, can be performed. However, due to their high cost, these visits are not a very practical method for routine quality assurance. Site visits with concurrent review by dental managers are often used as a last resort to find the bad apples.

ii) Peer Review

Peer review, in dental public health programs, involves concurrent review of the quality of service by peer staff members. Staff teams visit each other to observe a typical day in the clinic. Each peer reviewer makes notes on the quality of service provided by the staff member being reviewed. These notes form the basis of a constructive group discussion when all

reviews are completed. Management is required to plan the process of peer review, provide checklists and in-service training for all involved staff, and arrange staff time for site visits and post-review group discussion.

The use of peer review can be advantageous in ensuring quality in direct service programs. Besides increasing managerial efficiency, peer review also empowers staff to take control of the quality of service being provided by the program. As a result, ownership of quality assurance shifts from management to the service provider.^{30,31}

c) Examples of Retrospective Review

Management often plans retrospective reviews on a random sample of patients receiving dental program services (perhaps 10%). Retrospective reviews are appropriate methods of assessing the process and outcome dimensions of care.

i) Chart Audits

The integrity of the treatment plan is a useful device in evaluating the quality and ethical standards maintained in the provision of dental services. An ethically structured treatment plan builds on the Hippocratic principle "first, do no harm" by adding "neither by over treatment nor under treatment." Such a treatment plan further reflects the exercise of clinical judgment that focuses on disease management and oral health maintenance.³²

Adequately documented patient records provide a history of the oral conditions before treatment, the diagnostic process, the treatment plan, the sequencing of treatment, and the treatment provided. The patient chart can, therefore, be used as a record of the processes involved in providing patient service. Dental radiographs are very useful in a chart audit, as they provide our best view of the necessity for and results of treatment done in the past.

ii) Practice/Practitioner Profiling

In situations where adequate data are available, the relative number and type of services being

provided by individual providers can be evaluated. To determine if the pattern of services is unusual, the profile of one individual can be compared with the average profile. Computerized management information systems (MIS) allow program managers to look for practices or individuals who may be abusing certain procedure codes or over/under treating patients.

By itself, profiling does not prove that a quality problem exists. Rather, it is a useful screening device to identify service providers who may require a more in-depth and direct quality assessment.

iii) Direct Patient Examination

Since much of dental treatment involves restoration of teeth or provision of discernable treatment, permanent evidence of treatment quality is available in patients' mouths.⁵ Assessment of the technical quality of treatment, such as marginal integrity of restorations, retention of sealants, missed pathology, and patient satisfaction, can all be assessed by direct patient examination and questioning. It has been shown that patients accept this component of quality assessment as long as it does not involve direct costs to them.^{33,34}

Practice Level Quality Assurance

Practice level quality assurance can take many forms. Checklists, routine staff meetings, and self-assessment manuals and standards (SAMS) are all methods proposed for ensuring quality at the dental practice level.³⁵⁻³⁷

Patient Attitudes Toward Quality Assurance

Patient perception of the quality of dental care and patient interest in becoming involved in a quality assurance program is a concern of both private practitioners and dental quality administrators. Studies in the 1980s reported that patients were in favour of quality assurance; specifically, they were in favour of peer review with clinical evaluation and of mandatory continuing education.³³ More than 90% of the people surveyed were willing to cooperate with clinical review examinations, and expressed increased

trust and confidence in their dentist's care after experiencing reviews. Thus, fear of alienating patients may be an unfounded concern.

The Public Trust, the Professional, and Quality Assurance

Organized dentistry has been granted the public trust for taking care of vulnerable people. Most of the elements in a quality assurance system can be seen to fulfil the professional requirements of this public trust. **Table II** shows the relationship between the different elements of quality assurance and the requirements of a profession. The historic methods of ensuring the quality of dental services as well as the newest trends can be seen to be meeting society's expectations for maintaining professional status.

Conclusions

The dental profession's leaders, managers and practitioners need to be familiar with the elements of quality assurance, including the dimensions of quality, the level of assessment, and the timing with respect to service provision. Quality assurance protects and enhances quality through system design and performance monitoring. These quality assurance activities need to be incorporated into operational planning to ensure the efficient maintenance of high quality health care in the dental profession, direct service programs, and among private practitioners. ■

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CLINICAL PRACTICE



Dental Composite Biomaterials

Derek W. Jones, PhD, FIM, C.Chem., FRSC(UK), FBSE

PRACTITIONER'S QUESTION

I am being bombarded by suppliers who insist on showing me every composite on the market. I would like to have a description of the most popular types/brands of composites and their uses.

© J Can Dent Assoc 1998; 64:732-4

Dr. Jones's Reply:

Introduction

The proliferation of composite materials on the market has been confusing for the practising dentist. However, in spite of the large number of dental composite products that have appeared during the past 15 years, they all have simple, common characteristics. They are all combinations of silane-coated inorganic filler particles with dimethacrylate resin, either BIS-GMA or urethane dimethacrylate (UDEMA). In some cases, a proportion of a lower molecular weight monomer such as TEGDMA is introduced to lower the viscosity. The filler particles used are either barium silicate glass, quartz or zirconium silicate, usually combined with 5-10% weight of very small-sized ($0.04 \mu\text{m}$) particles of colloidal silica. Modern dental composite materials are thus a blend of glass or ceramic particles dispersed in a photo-polymerizable synthetic organic resin matrix. The polymer

materials are blended together with the finely divided inorganic material such as a barium aluminosilicate glass or other glass compositions having an effective amount of radiopaque oxide that renders the resultant glass radiopaque to x-rays.

Many practitioners are perplexed by such terms as: conventional, traditional, all-purpose, universal, anterior, posterior, small particle, fine particle, hybrid, microfilled, compomer, flowable and packable. The terms "conventional" and "traditional" relate to materials that were developed in the 1970s, and although they have been slightly modified over the years, they tend to be less used in 1998. The terms "all-purpose," "universal," "anterior" and "posterior," which describe the intended uses of the composites, are more easily understood by the dentist.

Physical Characteristics

Often the mean particle filler size is given in an attempt to characterize the type of material. Unfortunately, this can also be mis-

leading, since the mean particle size cannot give any indication of the range of particle size. However, even giving the range does not indicate the distribution of the particles within the range.

An important characteristic is the surface area of the filler particles. The smaller the particle size, the larger the surface area. For example, a cube of filler material with dimensions of $2 \times 2 \times 2 \mu\text{m}$ would have a surface area of $24 \mu\text{m}^2$. By cutting the cube into two halves, the surface area would increase by $8 \mu\text{m}^2$, giving a surface area of $32 \mu\text{m}^2$. The surface area of filler particles is usually given in square metres per gram (m^2/g). The surface area of submicron-sized fumed silica that is incorporated in small amounts into most composites is very high — about $130 \text{ m}^2/\text{g}$. The surface area measured for filler particles for a number of commercial composites ranged from 4.4 to $65.6 \text{ m}^2/\text{g}$.

In order to achieve a higher filler loading, a wide distribution of filler particle size must be present. In most cases, the filler

weight percentage is given, which is unfortunately not as valuable as filler volume percentage, since it is the volume of exposed resin matrix to abrasion and the volume of matrix resin that has to polymerize that are important. It is obvious that a heavier (denser) filler would occupy less volume for a given weight of filler. For the same filler loading by weight, for example, if filler "A" had a density of 2 g/cc and filler "B" had a density of 3 g/cc, then the less dense filler "A" would occupy almost 50% more volume than filler "B". Thus, simply quoting the filler loading by weight percentage can be misleading. The filler content by volume does in fact characterize composite materials quite well.

Types Of Composites

A number of composite materials are described as all-purpose or universal, the implication being that they can be used for both posterior as well as anterior use. However, some are indicated as being suitable only for small posterior restorations. Confusion arises when some of these same materials are also described as hybrid composites. Charisma, Herculite XRV, Prodigy, Tetric, TPH (Total Performance Hybrid), and Z-100 are examples of this type. Some materials have been described as posterior composites, for example, Adaptic II, Clearfil, Heliomolar RO, Marathon, Occlusin, P-50, Post Com II. Examples of materials described as anterior composites include Silux Plus and Durafill.

The microfilled composite was developed to satisfy the need for a polishable composite. These materials have a very fine particle size of colloidal or fumed silica (0.04 μm) dispersed in a resin matrix. However, the very large surface area of the fumed silica filler (130 m^2/g) significantly limits the volume of filler that can be incorporated. The manufacturers have attempted to overcome this problem by dispersing the filler in a resin that is heat cured, then ground to produce particles of about 25 μm . These heavily filled composite particles are then dispersed into a lower filled

resin matrix of relatively low viscosity. These microfilled resins have lower filler loading than the hybrid, all-purpose or universal materials.

The microfilled composites have lower mechanical properties due to the larger volume of resin. However, some microfilled composites have demonstrated wear resistance comparable to more heavily filled wear-resistant composites. Microfilled materials include Denta-colour, Durafill, Heliomolar RO, and Silux Plus. The wearing mechanism of composites is not fully understood, but the breakdown of composites is known to be related to degradation resulting from hydrolytic, mechanical and enzymatic phenomena.

The term compomer, a combination of COMposite and ionOMER, has been introduced in the past few years. It was intended to suggest a combination of composite and glass-ionomer technology. Although these materials contain a reactive fluoride glass and an unsaturated acidic constituent, they are anhydrous. No acid-base reaction takes place during the initial setting. As a result, the initial setting reaction for these materials is the same as for the regular light-curing composites. Any reaction between the ion-leachable glass and the acidic monomer can take place only when the compomer takes up water. These materials have strength values that are superior to conventional glass ionomer materials, but lower than the hybrid, all-purpose or universal composite materials. Compoglass and Dyract are examples of compomer materials.

Radiopacity

One of the requirements of using a composite as a posterior restorative is that it should be radiopaque. In order for a material to be described as being radiopaque, the International Standard Organization (ISO) specifies that it should have radiopacity equivalent to 1 mm of aluminium, which is approximately equal to natural tooth dentine. However, there has been a move to increase the radiopacity

to be equivalent to 2 mm of aluminium, which is approximately equal to natural tooth enamel. A majority of the composites described as all-purpose or universal have levels of radiopacity greater than 2 mm of aluminium.

Posterior Composites

Although composite materials have significantly improved in recent years, their use as routine posterior restoratives is not generally recommended. Clinical trials have shown typical wear rates for the modern posterior (all-purpose or universal) composite materials of between 7 and 12 $\mu\text{m}/\text{year}$. However, the clinical trials reported in the scientific literature have been carried out by academics under specially controlled conditions, and may not be typical of the results obtained in a busy general dental practice. Occlusal wear will take place in areas of occlusal contact. Occlusal wear can cause over-eruption of the opposing tooth. Analysis of two-year clinical wear data indicates a strong correlation with the flexural strength, the stronger materials exhibiting the least wear. In vitro tests have indicated that the composite materials which cause the most wear of opposing tooth enamel are also the materials which exhibit the greatest abrasion loss themselves. Dental amalgam has been shown to cause the least wear of tooth enamel and undergoes less wear itself than any composite.

The placing of posterior composites is regarded as a difficult operative procedure because of the difficulty in attaining ideal proximal contacts. Pulp protection is essential. Incremental build-up is mandatory; the material must be placed in several layers to minimize polymerization shrinkage during light curing. However, polymerization shrinkage — 1.5-2.5% by volume — is inevitable. The occlusion must be adjusted meticulously. It is exceedingly difficult to finish composites in the gingival proximal areas. Composite materials are technique sensitive and require about twice the time to place compared to amalgam.



Composite materials do not undergo complete polymerization; about 40-60% of the carbon bonds remain unsaturated. Polymerization is compromised by oxygen inhibition, but this problem has been minimized to some extent by the development of photo-cured systems, which reduce the potential for oxygen incorporation that occurred during mixing of chemical setting type materials. Most composite resin restorative materials are now photo cured. The elastic modulus of the stiffest posterior composite materials is typically about half that of tooth enamel and other restorative materials such as dental amalgam and dental porcelain.

Concerns About Composite Materials

The full potential of glass and glass/ceramic/resin composite biomaterials may not yet have been achieved since the current composite materials cannot completely withstand the aggressive environment of the oral cavity. Composite materials have been criticized, by those who see amalgam as the material of choice, for having inadequate toughness, low modulus, insufficient ductility and poor wear resistance. The procedure for composites, unlike amalgam, requires very careful moisture control. It is also accepted that composite materials do not fully polymerize. Some polymer degradation products such as bis phenol A (an estrogenic substance), TEGDMA, formaldehyde, methacrylic acid and benzoic acid, have been eluted from dental resins. It has also been shown that the filler particles result in degradation products such as silicon, boron and aluminium. However, most of these criticisms are not major concerns.

The main problems with composite materials such as posterior restoratives are: lack of wear resistance, low modulus and incomplete polymerization, and polymerization shrinkage that adversely affects long-term survival.

The modulus of elasticity of dental composites is regarded as

an important fundamental property, since a material with a low modulus will more readily elastically deform under functional stresses. Excessive elastic deformation under functional stress may result in the fracture of surrounding brittle tooth enamel structure, or alternatively, in an increase of micro-leakage. A composite restoration with a higher modulus of elasticity will be able to provide support at the interface with tooth enamel to protect the enamel rods at the margin from fracturing.

The use of polymer/glass or ceramic composite systems as posterior dental restoratives that will be subjected to much higher levels of stress than anterior restorations might suggest the use of materials with higher modulus of elasticity to minimize the risk of cusp fracture. Higher modulus of elasticity and lower polymerization shrinkage are achieved with higher filler loading combined with acceptable long-term silane coupling between the filler and the resin matrix. The main advantages of composite materials are good esthetics and the use of adhesive systems that can bond the composite to enamel and dentine.

It is extremely important to select with care and caution the clinical situation that can be treated with a posterior composite restoration. The long-term wear of posterior composite restorative materials is influenced by a wide range of factors, such as:

- chemistry of the resin matrix (most materials are very similar);
- chemistry of the filler (most materials are very similar);
- effectiveness of the silane coupling agent (most materials are reasonably similar);
- size, distribution, shape and volume of the filler (considerable variation);
- size and location of the dental cavity preparation (considerable variation);
- magnitude, location and direction of the occlusal forces (can vary widely);

- degree of polymerization (similar but also influenced by clinical technique); and
- clinician's technique (most important factor).

Use Of Composite Materials

Materials placed in high-stress situations should be highly filled materials (or materials that have several years of clinical trial success in posterior restorations) possessing good radiopacity preferably equal to dental enamel. Any anterior composites should exhibit good translucency, which is found with the less highly filled composites. However, several of the so-called "hybrid" materials containing very translucent fillers can produce excellent results. ■

Dr. Jones is professor of biomaterials, at Dalhousie University, Halifax, Nova Scotia.

The author has no declared financial interest in any company manufacturing the types of products mentioned in this article.

Editor's note: I invite readers to send me questions about clinical problems experienced in everyday practice. I will seek answers to these questions from recognized Canadian experts. You can send me your questions by e-mail, fax or regular mail. I look forward to hearing from you.

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ARE YOU A NEW DENTIST?

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The Canadian Dental Association maintains a data bank of new dentist members who are interested in becoming involved in the activities of their national organization. New dentists are defined as members who have graduated within the last 10 years.

Currently, only four per cent of CDA's committee, council and board members are new dentists, even though new dentists account for 28 per cent of the association's membership. CDA is attempting to increase the proportion of new dentists serving in CDA's political structure to correspond with the proportion of new dentists in CDA's total membership.

If you are interested in serving as a member of one of CDA's committees, please write to CDA, attention Ruth Beaulieu, Coordinator, Corporate Affairs, enclosing a current curriculum vitae. Your name will then be added to the data bank for consideration when vacancies arise. Should your name be chosen, you will be contacted for further confirmation of your interest in serving.

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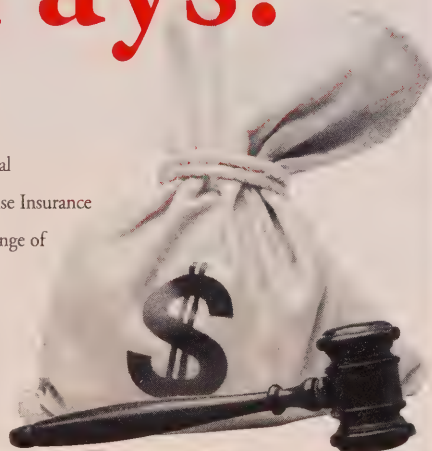
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PROFESSIONAL ISSUES



Why Do We Need Education In Geriatric Dentistry?

David Matear, BDS, B.M.Sc., DDPH, M.Sc., FRSH, MHSM, MIMgt

ABSTRACT

The elderly are the fastest growing segment of the population, both in number and as a percentage, throughout the world. The challenges of dealing with the increased need for oral health care in older adults requires a holistic approach in order to deal not only with their clinical needs, but with their social, functional and communication needs as well. Undergraduate and graduate programs in dentistry in Canada should focus on all the needs of the geriatric population. This is essential if future dental professionals are to gain an understanding of the true dental health care requirements of the elderly and acquire the knowledge, experience and willingness to provide appropriate care for their varied and growing geriatric clientele.

MeSH Key Words: dental care for aged; geriatric dentistry/education; geriatric dentistry/trends.

© J Can Dent Assoc 1998; 64:736-8

Introduction

In the middle of the 20th century, world life expectancy at birth was 46.5 years. Today, better nutrition and medical care have lengthened lives around the globe. In Canada, for example, life expectancy at birth in 1996 averaged 79 years. Life expectancy will likely increase in the next century to the point where it is expected that the world's over-65 population will nearly double by the year 2020.¹ The decreased birth rate in developed countries is another factor having an impact on the changing age structure of the population.² These trends will result in an increase in the percentage or proportion of elderly within the population. It should be emphasized that although the maximum life expectancy of the human species has not changed significantly since records have been

kept, many more people are now living into old age.³ This will inevitably have a significant impact on the field of dentistry as more elderly patients utilize our health care institutions or seek care in non-institutional settings such as the home, community-based clinics, or private practices.⁴

In Canada, there are no formal university departments or centres of learning that provide structured undergraduate or graduate courses specifically directed to geriatric dental care. Dentistry as a profession should recognize, and prepare to meet the challenges of, the age-related concerns that influence the dental management, clinical decision making and treatment of this part of the population.

The aim of this paper is to demonstrate the need for training and education in geriatric dentistry. This development is imperative if the dental profession in Canada is

to address the oral health care needs of this rapidly expanding segment of our population.

Demographics

Statistics Canada⁵ reports that seniors over the age of 65 constitute one of the fastest growing population groups in the country. In 1995, there were an estimated 3.6 million seniors, which constituted 12% of the total population. This was an increase of 2% from 1981 and 7% from 1921. This age group is expected to continue to grow rapidly during the next several decades. It is projected that by the year 2016, 16% of all Canadians will be aged 65 and over, and that by the year 2041, an estimated 23% of the population will be seniors.

A rapid increase in the number of people in the very oldest age category has also occurred. In 1995, 1.2% of the total population

was aged 85 and over, double what it was in 1971 (0.6%) and six times more than in 1921 (0.2%). This group is also expected to continue increasing rapidly in the approaching decades, reaching a projected 1.6 million in 2041, or 4% of the total population.⁵

Oral Health Care and the Elderly

The issue of oral health care and the elderly can be divided into four sub-themes:

1. the needs of the elderly;
2. barriers to oral health care;
3. the dental profession and practice; and
4. education in geriatric dentistry.

1. The Needs of the Elderly

Traditionally, dentistry has been based on the detection and treatment of oral disease. This type of professionally determined need is only one aspect of the overall needs of the elderly population, with respect to both their oral health and their general health care requirements. As far back as 1972, Bradshaw⁶ separated *need* into five categories: felt needs, expressed needs, normative needs, comparative needs, and unmet needs. More recently, Kay⁷ described need with respect to social norms and expectations, impact on daily life, demands on service, esthetics, social environment and peer group. The needs of individuals and populations are, therefore, wide-ranging and vary from individual to individual and population to population. The challenge is to determine the true needs of the elderly population, which are growing very rapidly.

In studies conducted by Jokovic and Locker,^{8,9} a significant percentage of community-dwelling elderly adults (20.5%) indicated that their oral health had deteriorated over a three-year period and almost one-third expressed dissatisfaction with their standard of oral health with respect to: ability to chew, dental appearance and ability to speak. The negative perceptions associated with oral health can have a detrimental effect on the quality of

life of elderly individuals.¹⁰ These findings corroborated a similar report by Thomson and Cautley, in 1996.¹¹ The oral health status of homebound elderly has also been assessed,¹² with 84% having been found to be in poor oral health. These numbers highlight the necessity for the profession to focus on geriatric dentistry.

2. Barriers To Oral Health Care

In order to deliver adequate oral health care to individuals in need of care, the concept of access must be addressed. Penchansky and Thomas¹³ define access as the "fit between clients and the system," which is reliant on: availability, accessibility, accommodation, affordability, and acceptability. These factors can be investigated by examining the perceptions of the client or customer and of the service provider. If any component of the concept of access is not addressed, barriers to the receipt of care can arise.

Barriers can be created by the population (society), the dental profession, and the client. Finch et al.¹⁴ found that both cost and anxiety were the two main barriers to an adult seeking dental care. However, within the elderly population, these barriers are apparently not as important. The main barriers within the geriatric population may be the perceived need for dental care and the perceived importance of dental care.¹⁵ Non-professional or lay opinions, and popular perceptions with respect to oral health, can create major problems in the delivery of care. These barriers highlight the importance of educating all stakeholders in the holistic care of the elderly population as well as the need for an integrated approach to total health care, including oral health care. This focus must take place within the health care professions and be coordinated and guided by academics responsible for the education of professionals involved in the oral health care of the geriatric population.

3. The Dental Profession and Practice

There has been little focus on the needs of the geriatric population with respect to the provision of adequate oral care. The reasons cited for this are as follows:¹⁶

- a) nature of the dental problems of the elderly;
- b) lack of infrastructure;
- c) lack of experience;
- d) lack of financial incentives; and
- e) negative attitudes toward the dental care needs of the elderly.

Historically, dentistry has been targeted toward the well, able, and ambulatory persons.¹⁷ The elderly seem to have been bypassed by dentistry's changing approach to primary prevention.

Different techniques are needed to cope with elderly patients, whose multiple medical problems, medications and need for specialist attention and treatment, may elicit fear and sometimes lack of confidence in the dentist. The lack of an adequate infrastructure to provide proper dental treatment for the elderly represents an additional barrier for the dentist. The practice of dentistry is based on technological equipment and devices, which are located in the dental office. Institutionalized and homebound elderly, however, need the dentist to come to them. This requires the availability of dental equipment in institutional care settings or the use of portable equipment. It also necessitates "a house call" from the dentist, requiring additional time per patient. Dentists, in general, lack the experience of treating patients away from the private dental office setting and do not usually have the skill nor infrastructure to coordinate such treatment.¹⁸ There is little financial incentive for dentists to treat the elderly and to spend the additional time needed for their care. There is also additional capital expense when dentists treat patients out of the office.

The experience of dealing with patients outside of the dental office

setting should be addressed during the undergraduate and graduate training of general and specialist dentists. Geriatric dentistry programs have been introduced in some dental schools in the United States to reduce the gap between professional training and practice. A similar step should be taken in the dental schools in Canada.

4. Education In Geriatric Dentistry

Unlike our U.S. counterparts, there are no formal geriatric dentistry programs at the undergraduate or graduate levels in dental schools in Canada. Claus¹⁶ has listed the most popular topics within these courses, which were identified as clinically related courses that would normally be part of any oral medicine or removable prosthodontics course. The least popular topics were more gerontological and related to the "true needs" of the homebound and institutionalized elderly. Many of these courses have, therefore, reflected the traditional dental curricula despite the fact that such approaches have failed to provide adequate oral health care to the elderly. It should therefore be possible to incorporate, effectively and efficiently, geriatric dentistry training programs into undergraduate and graduate training. This would inevitably give credibility to this growing area of dentistry. The emphasis should not be on the pathological processes of aging, but rather on an understanding of the social, biological, emotional, political and economic aspects of the aging process. Focus should be placed on imparting knowledge in order to train a future population of dentists to become more willing and capable of taking on the oral health care needs of the growing geriatric population.

Conclusion

Existing evidence indicates that there is a growing need for oral health care in the geriatric population. The needs of the elderly are not being dealt with effectively by the dental profession. A focus on education in geriatric dentistry, both at the undergraduate and

graduate levels, is required in order to redress this situation, both now and in the future. Current trends and demographic changes indicate that unless measures are taken to address these oral health needs now, more problems will be encountered in the future.

The education of future dentists should take into account the concept of access as it applies to the geriatric population. This can only be carried out through a formal, organized approach led by faculties of dentistry.

Dental education in Canada has not focused on geriatric dentistry, even though trends in both demography and dental disease clearly prove that there should be a growing emphasis on this area of dentistry in the future. Formal educational programs for geriatric dentistry must include an infrastructure through which care for elderly populations can be provided. This is essential in order to impart the experience and confidence dentists will need to carry out this work in the future. Emphasis should be placed on an integrated and holistic approach to health care for the elderly. Courses should not be limited to pathological and curative approaches, but should encompass the social, biological, emotional, political and economic aspects of the aging process.

These factors necessitate the need for the development of educational programs at all levels in geriatric dentistry, and should help guide the development of the fastest growing and most complex area of dentistry in the future. ■

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CLINICAL PRACTICE



Towards Optimized Treatment Outcomes For Dental Implants: A Conference Report

John O'Keefe, B.Dent.Sc., M.Dent.Sc., MBA

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The Conference

I attended a conference entitled "Towards Optimized Treatment Outcomes for Dental Implants," held at the University of Toronto on April 24-25. Experts in the field of dental implants, from Canada and abroad, came together for the purpose of reaching a consensus on the types of treatment outcomes that should be measured in future scientific research about the efficacy and effectiveness of implant therapy.

The co-chairs of the conference organizing committee, Drs. George Zarb of Toronto and Tomas Albrektsson of Göteborg, Sweden, had previously been involved in publishing criteria for assessing successful implant treatment.^{1,2} The Toronto conference aimed to update those previous criteria in the light of new scientific evidence. The participants in the conference were researchers and clinicians, as well as the editors of major journals that publish the most important articles about dental implants.

On the first day of the conference, the following twelve speakers presented review papers reporting on various aspects of the literature relating to implants:

Dr. J.E. Davies (Toronto). Mechanism of endosseous integration.

Dr. P.-O. Glantz (Lund, Sweden). The choice of alloplastic materials — does it really matter with oral implants?

Dr. L. Sennerby (Göteborg, Sweden). Surgical determinants of clinical success of osseointegrated oral implants.

Dr. S. Koka (Lincoln, Nebraska). The implant-mucosal interface and its role in the long-term success of endosseous oral implants.

Dr. R.P. Ellen (Toronto). Microbial colonization of the peri-implant environment and its relevance to long-term success of osseointegrated implants.

Dr. C.C.L. Wyatt (Vancouver). Imaging techniques and interpretation for dental implant treatment.

Dr. D. Locker (Toronto). Patient-based assessments of the outcomes of implant therapy.

Dr. T. Dao (Toronto). Sensory disturbances associated with implant surgery.

Dr. S.R. Bryant (Toronto). The effects of age, jaw site and bone condition on oral implant outcomes.

Dr. N. Meredith (Bristol, England). Assessment of implant stability as a prognostic determinant.

Dr. A.B. Carr (Columbus, Ohio). What comprises successful long-term treatment outcomes in the field of osseointegrated implants: prosthodontic determinants.

Dr. P. Watson (Toronto). Prosthodontic components and techniques: do we need standards?

On the second day of the conference, the participants were divided into four groups and given the task of assessing the previously published criteria for implant treatment success¹⁻³ and making adjustments on the basis of the new information presented on the first day. There was plenty of lively discussion in the groups and the subsequent plenary session allowed for further debate about various success criteria. Following the conference, the organizing committee drafted the consensus statements presented below.

The Consensus Report

(Reprinted verbatim with permission from the *International Journal of Prosthodontics*, Volume 11, Number 5, page 389.)

The following considerations for successful outcomes with implant-supported prostheses are proposed:

1. Implant therapy is prescribed to resolve prosthodontic problems by permitting diverse prosthodontic

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dontic treatments, which in turn impact on the economics of the service. Such prostheses should meet the clinically evolved standards of function, comfort and esthetics. They should also allow for routine maintenance and should permit planned or unplanned revisions of the existing design. Treatment outcome success criteria for implant-supported prostheses should also be assessed in the context of time-dependent considerations for any required retreatment.

2. Criteria for implant success apply to individual endosseous implants, and
 - a. At the time of testing, the implants have been under functional loading.
 - b. All implants under investigation must be accounted for.
 - c. Since a gold standard for mobility assessment is currently unavailable, the method employed must be specifically described in operative terms.
 - d. Radiographs to measure bone loss should be standard periapical films with specified reference points and angulations.

The success criteria comprise the following determinants:

1. The resultant implant support does not preclude the placement

of a planned functional and esthetic prosthesis that is satisfactory to both patient and dentist.

2. There is no pain, discomfort, altered sensation, or infection attributable to the implants.
3. Individual unattached implants are immobile when tested clinically.
4. The mean vertical bone loss is less than 0.2 mm annually following the first year of function.

My Impressions Of the Conference

I came away from this conference with a number of strong impressions.

1. Canadians have been and continue to be world leaders in the field of implant dentistry.
2. There was an impressive commitment displayed at the conference to base therapy on the best available scientific evidence.
3. The message came out loud and clear that patient-focused outcomes are important and should be included in future research efforts.
4. Dentists are in the business of improving the quality of life of their patients.

Further Information

The full proceedings of this conference were published in the

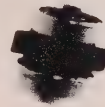
September edition of the *International Journal of Prosthodontics* (Volume 11, Number 5). For more information about the conference proceedings, please contact the CDA Resource Centre by e-mail (info@cda-adc.ca) or by calling 1-800-267-6354, ext. 2223.

The conference "Towards Optimized Treatment Outcomes for Dental Implants" was funded by: the University of Toronto, the Medical Research Council of Canada, the Dentistry Canada Fund, Göteborg University Craniofacial Reconstruction Unit, and Quintessence Publishing Company Inc. ■

Dr. John O'Keefe is the editor of the Journal.

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INTERNATIONAL



January 16-23, 1999

42nd International Alpine Dental Conference in Courchevel, France. Contact Marie-Ange Vitry, International Dental Foundation, 53 Sloane St., London SW1X 9SW, U.K. Tel.: 44 (0) 171 235-0788; or fax: 44 (0) 171 235-0767.

March 6-13

15e Forum de l'Association internationale francophone pour la formation continue en odontologie (AIFFCO), en Guadeloupe, avec la collaboration de la Faculté de médecine dentaire de l'Université Laval, Québec. Contact: Dr. Christian Bernard, Faculté de médecine dentaire, Université Laval, Québec. Tel.: (418) 656-5018; fax: (418) 656-2720; or e-mail: Ruth.Turcotte@fmd.ulaval.ca

March 20-27

43rd International Alpine Dental Conference in Courchevel, France. Contact Marie-Ange Vitry, International Dental Foundation, 53 Sloane St., London SW1X 9SW, U.K. Tel.: 44 (0) 171 235-0788; or fax: 44 (0) 171 235-0767.

April 21-24

Irish Dental Association Annual Scientific Conference in Cork City, Ireland. Contact Margaret Ferguson, Irish Dental Association,

10 Richview Office Park, Clonskeagh Road, Dublin 14, Ireland. Tel.: 00353 1 2830499; or fax: 00353 1 2830515.

June 21-26

6th International Dental Congress of the Turkish Dental Association in conjunction with the World Dental Federation (FDI) in Istanbul, Turkey. For information visit the Web site at www.dentalforum.viptourism.com.tr or call: (0-312) 435 93 94; fax: (0-312) 430 29 59; or e-mail: dentalforum@viptourism.com.tr

June 23-25

Stomatology '99 — International Dental Exhibition and Conference in St. Petersburg, Russia. Contact the International Trade and Exhibitions Group, Health Care Division, Byron House, 112A Shirland Rd., London W9 2EQ, U.K. Tel.: +44 171 286 9720; or fax: +44 171 266 1126; or by e-mail: healthcare@ite-exhibitions.com

CANADA



December 4-5

Annual Meeting of the Association of Prosthodontists of Canada in association with **The Greater New York Academy of Prosthodontics** in New York, NY. Contact Ms. Jennifer Rogers. Tel.: (905) 305-9373; or fax: (905) 886-8913.

December 5

Prosthodontics Series #2 - Bonded Prostheses — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; or fax: (519) 661-3797.

February 12, 1999

16e Journée scientifique de la Faculté de médecine dentaire de l'Université Laval in Quebec. Contact Mr. Charles Garon, Formation continue, Pavillon Louis-Jacques-Casault, Université Laval, Québec G1K 7P4. Tel.: (418) 656-3202; or toll-free: 1-800-561-0478, ext. 3202; or fax: (418) 656-5538; or by e-mail: charles.garon@dgfc.ulaval.ca

March 10

Symposium on Orofacial Pain — From Basic Science To Clinical Management at the Simon Fraser University, in Vancouver, BC. Contact Lucille Gendron by fax: (514) 343-2233; or e-mail: gendrol@medent.umontreal.ca

March 17-20

Western Canada Dental Society Curling Bonspiel and Seminar in Edmonton, Alta. Contact Dr. Rick Brisbane, 304-8225 105 St., Edmonton AB T6E 4H2. Tel.: (403) 439-6037; or fax: (403) 439-0145.

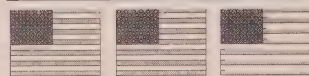
April 31 and May 1

Meeting of the Southern Ontario Surgical Orthodontic Study Group in Windsor, Ont. Contact Dr. Jeff Berger by tel.: (519) 258-2632; by fax: (613) 258-2637; or e-mail: jberger@mnsi.net

July 15-18

Canadian Psychological Association to host AIDS Impact 1999 in Ottawa, Ont. Contact AIDS Impact 1999 Secretariat, 151 Slater St., Suite 205, Ottawa ON K1P 5H3. Tel.: (613) 237-2144; or fax: (613) 825-0530. Web site: www.aidsimpact.com

U.S.A.



February 3-6, 1999

6th Annual Conference and Exhibition Of the Academy Of Laser

Dentistry in Palm Springs, Calif. Contact the Academy Of Laser Dentistry, 10435 Vernon Ave., Huntington Woods, MI 48070-1526. Tel.: (248) 548-7171; fax: (248) 548-7174; or e-mail: acohen@laserdentistry.org

February 5-13

Pennsylvania Academy of General Dentistry's 9th Annual Caribbean Winter Seminar in St. Martin/St. Maarten. Contact Dr. Tom Howley. Tel.: (215) 699-8751; fax: (215) 699-5618; or e-mail: TAHOWLEY@aol.com

February 11-13

Miami Winter Meeting and Dental Expo in Miami, Fla. Contact the East Coast District Dental Society, 420 S. Dixie Hwy, Suite 2E, Coral Gables, FL 33146-2271. Tel.: 1-800-344-5660; (305) 667-3647; or e-mail: ecdds@ecdental.org

February 26-28

Barbados Dental Association's 11th Annual Mid-Winter Convention, in Barbados, W.I. Contact Mrs. Fay Mack, Barbados Dental Association, 17 Pine Rd., Belleville, St. Michael, Barbados, W.I. Tel.: (246) 228-6488; or fax: (246) 228-6488. In Canada, contact Lynne Brandon, tel.: (519) 657-4306 (evenings); or fax: (519) 472-9120; or Mr. Jerry Sheppard tel.: (519) 434-1647 (days); or fax: (519) 434-4936.

March 4-6

14th Annual Meeting of the Academy of Osseointegration in Palm Springs, Calif. Contact the Academy Headquarters, 401 North Michigan Ave., Chicago IL 60611-4267. Tel.: (312) 321-5169; or fax: (312) 321-5150; or by e-mail: academy@osseo.org

April 23-26

Minnesota Dental Association's Star of the North Meeting in Saint Paul, Minn. Contact the Star of the North Meeting, 2236 Marshall Ave., Saint Paul MI 55104. Tel.: (651) 646-7454; or fax: (651) 646-8246; or by e-mail: mndental@mn.uswest.net

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DENTAL MEETINGS



January 28-30, 1999

Manitoba Dental Association Annual Meeting in Winnipeg, Man. Contact Mr. Ross McIntyre, Tel.: (204) 988-5300; or fax: (204) 588-5310.

February 18-20

Pacific Dental Conference At Vancouver in Vancouver, B.C. Contact Ms. Marilynne Webster. Tel.: (604) 714-5303; fax: (604) 736-3645; or Web site: www.pd-conf.com

March 26-27

CDA Board Of Governors Interim Meeting in Ottawa, Ont. Contact Ms. Suzanne Burton. Tel.: (613)

523-1770, ext. 2201; or 1-800-267-6354.

April 29 - May 1

Ontario Dental Association 132nd Annual Spring Meeting in Toronto, Ont. Contact Ms. Diana Thorneycroft. Tel.: (416) 922-4162, ext. 346; fax: (416) 922-9005; or e-mail: pdasm@oda.on.ca

May 25-30

93rd Annual General Meeting of the Alberta Dental Association in Jasper, Alta. Contact Dr. E.W. McIntyre. Tel.: (403) 484-1336; or fax: (403) 489-4930.

May 27-29

Prince Edward Island Dental Association Annual Meeting in Woodstock, P.E.I. Tel./Fax: (902) 892-4470.

May 29 - June 2

28e Congrès annuel de l'Ordre des dentistes du Québec in Montreal, Que. Contact Mrs. Nicole

Pagé. Tel.: (514) 875-8511; or fax: (514) 393-9248.

June 4-5

New Brunswick Dental Society Annual Meeting in Saint John, N.B. Contact Mrs. Barb Wishart. Tel.: (506) 452-8575; or fax: (506) 452-1872.

June 19-20

Nova Scotia Dental Association Annual Meeting in Pictou, N.S. Contact Mr. Steve Jennex. Tel.: (902) 420-0088; or fax: (902) 423-6537.

Notices of meetings and continuing education courses are published without charge for appropriate **not-for-profit** dental organizations, teaching facilities or recognized study clubs. Information must be received two months prior to the expected publication date, and will be published at the discretion of the editor. Send all requests c/o Ms. Rachel Galipeau, *Journal* editorial assistant, Canadian Dental Association, 1815 Alta Vista Dr., Ottawa, ON K1G 3Y6.

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Journal

November
1998
Vol. 64
No. 10

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Offices & Practices

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ALBERTA - Red Deer: \$280,000 - modern cost share, established 26 years, superior location and 2,000 active patients generating \$480,000. Vendor to stay on to maximize retention in this unique and dynamic part TMJ practice. Contact: Marie Aisthorpe, tel. (403) 640-1422, (800) 661-1254, voice mail #216, e-mail craigais@agt.net D371

ALBERTA - Calgary: Downtown; opulent 1,800 sq. ft., three-plus-one operator, high-tech practice with desirable lease in place. Established 2 years. Generating \$226,000. Ideal situation for high-profile dentistry. Contact: Marie Aisthorpe, tel. (403) 640-1422, (800) 661-1254, voice mail #216, e-mail craigais@agt.net D372

ALBERTA - Southern: Sunny southern Alberta. Centrally located in a small community within 1 hour of Calgary city limits. Grossing upwards of \$400,000 with 1,300 active patients in three operatories with pan. Maintains a great deal of untapped potential, 100% financing for qualified purchaser. Ideal location to raise a family. Contact: Marie Aisthorpe, tel. (403) 640-1422, (800) 661-1254, voice mail #216, e-mail craigais@agt.net D373

ALBERTA - Beiseker: \$60,500. One operator with pan. Country satellite practice located 45 minutes northeast of Calgary. Established 5 years, low overhead, generating \$90,000 to \$150,000. First reasonable offer will not be refused. Contact: Marie Aisthorpe, tel. (403) 640-1422, (800) 661-1254, voice mail #216, e-mail craigais@agt.net D374

ALBERTA - Southwestern: Due to illness, must sell established rural general practice in the foothills of the Rocky Mountains. Beautiful new office built 5 years ago. Will stay on as associate to

smooth transition. Excellent staff, hygienist, computer system, intraoral camera. Unbeatable lifestyle - skiing, watersports - yet 1 hour from the city. Phone (403) 627-4972, afternoons. D175

BRITISH COLUMBIA - Vancouver: Extremely motivated purchaser seeks dental practice opportunity in Vancouver, downtown or west side. All offers remain strictly confidential! Reply to: CDA Classified Box # 2758. D369

BRITISH COLUMBIA - North Vancouver: Central Lonsdale. Dental practice for sale. Please call Mr. Brian Dougherty at (604) 986-7307. D377

BRITISH COLUMBIA - Penticton: Busy family practice for sale - located in strip mall in Penticton. Existing dentist would like to stay on as partner or part-time associate. Fax (250) 493-1986 or tel. (250) 493-0020. D353

BRITISH COLUMBIA - Vancouver: Urban sophisticate wanted for downtown Vancouver, British Columbia waterfront dental office. We are a professionally managed, solo-group format of seven dentists in three separate practice locations in the Vancouver downtown core. This location is a two-dentist, three-chair dental office with all the hi-tech goodies, yet highly efficient and profitable. This is a very busy "state-of-the-art" dental practice in a ground-floor, retail-style setting looking out at the water through 10 ft. glass windows - very relaxing. This is a purchase or short-term associate with a guaranteed buy-in at preset below-market price. 100% financing in place for the right dentist, but there is a catch. You must be committed to lifetime learning, excellence in clinical skills, patient oriented and be willing to either teach part time or be involved in study clubs. Female dentists are urged to consider this practice, as our flex schedule and above-average time off allow you to balance family and professional responsibilities. A second language (any language) would be an asset as would a great sense of humour and good endodontic skills. Please fax your CV with a covering letter stating your philosophy and goals to: Dr. Armstrong, Managing Doctor, Aarm Dental Group, (604) 683-5468. D331

BRITISH COLUMBIA - Penticton: Busy family practice located in strip mall in Penticton, B.C. Existing dentist would like to stay on as partner or part-time associate. Fax (250) 493-1986 or tel. (250) 493-0020. D258

BRITISH COLUMBIA - Lower Mainland: Exceptional opportunity to become the owner of an established practice in a growing community in the beautiful Fraser Valley. Vendor willing to stay as needed to ensure a smooth transition. Please reply to: Manfred Purtzki, tel. (250) 754-1951, fax (250) 754-1577. B.C. only, toll free, tel. (888) 668-0629 or toll free fax (800) 665-7211. D244

BRITISH COLUMBIA - Victoria Area: Practice opportunity wanted. Mature dentist desires purchase or partnership in Victoria, B.C., or surrounding communities. All offers will be given serious consideration. Please reply in confidence to: CDA Classified Box # 2720. D045

BRITISH COLUMBIA - Okanagan: For sale, rural Okanagan practice in four-season holiday area. Only office in 15 km. radius, serving about 3,000 population. Reply to: CDA Classified Box #2754. D332

NEW BRUNSWICK - Moncton: Established orthodontic practice, orthodontist retiring in next 2 years. Practice is winding down and available at a very reasonable figure. A thriving community with excellent amenities, sailing 15 minutes away in Shediac. Please reply to: CDA Classified Box # 2759. D370

NEW BRUNSWICK - Saint John: Mature dental practice in midtown Saint John. Two fully equipped operatories, pleasant surroundings, clean building. This is an ideal opportunity for someone who is interested in entering into a practice in the Saint John area. Reason for selling is retirement. For more information, please contact: Bill Tingley, tel. (800) 565-1525 in the Maritimes or tel. (902) 835-1103 locally and outside Nova Scotia and New Brunswick. D286

NEW BRUNSWICK - St. George: Dental practice for sale in beautiful St. George, New Brunswick, only 40 minutes west of Saint John. The office is located in a totally renovated building on the main street entering the town, and is further enhanced by its exquisite view of the river. The practice is grossing in excess of \$300,000 per year and growing! An associateship/buy-in situation is negotiable as well as living accommodations. For further information please contact: Laura Mitchell, tel. (506) 633-8485. D314

LABRADOR - NEWFOUNDLAND: Well-established practice for sale. Three new operatories (one hygiene). Excellent staff, full-time hygienist. Computerized, panoramic X-ray. Two specialists rotate through clinic - periodontist, oral surgeon. Call Dave Harris at (902) 421-1533. D293

ONTARIO - Hamilton Mountain: Prime location. General practice for sale. Established 12 years ago; 1,500 sq. ft. with six operatories, two fully equipped, computerized. Owner relocating. Please reply to: fax (905) 523-4414. D359

QUEBEC/ONTARIO - Ottawa-Outaouais: Clinique moderne, en pleine expansion. Propriétaire-associé doit vendre sa pratique. Raison: obligation familiale. Facturation annuelle: 330,000\$ et plus. Possibilité de transition. Communiquez avec Louise au (819) 246-9191, a/s Dr. Lavergne. D354

QUEBEC - Montreal: Dental office space to rent or share with two other dental offices or for an associate. Located just across from the subway-Metro Snowdon. Please call (514) 484-3110 or (514) 488-9648. D352

SASKATCHEWAN - Southeastern: Owner retiring. Step into well-established dental practice in southeastern Saskatchewan in resort area with waterslides, golf courses, fishing, beaches and many other amenities. Close to Manitoba and U.S. borders. Computerized recall with 2,400 active files. Large trading area. Satellite clinics available. Low overhead. Buy in at give-away price. Available for transition. Reply to: CDA Classified Box # 2760. D376

Positions Available

ALBERTA - Edmonton: Part-time associate required for progressive, quality-oriented family practice. Applicant must be very personable and have an interest in producing quality cosmetic dentistry. Please fax resume to (403) 438-6939 or tel. (403) 437-4816. D366

ALBERTA - Calgary: Associate wanted for full-scope, active oral and maxillofacial surgery practice in Calgary, Alberta. Candidate must be trained in all aspects of the specialty and eligible for specialty licensure in the province of Alberta. Please send CV to: CDA Classified Box # 2755. D344

BRITISH COLUMBIA - Central Vancouver: Very busy oral and maxillofacial surgery practice is seeking an associate/partner. New facility, excellent staff, three hospitals including trauma coverage for a nearby 447-bed, acute care facility. Please reply in confidence to: CDA Classified Box # 2757. D360

BRITISH COLUMBIA - Central Vancouver Island: Progressive dental practice in Campbell River requires an associate interested in future partnership and eventual buyout later. Campbell River is one of the fastest growing areas in B.C. The outdoor opportunities are unlimited and the quality of life doesn't get any better. We provide high quality dentistry in a new office with six operatories and modern, state-of-the-art equipment in own building in prime location. Experience preferred. Hours negotiable. Please reply to: Fax (250) 923-4093. D347

BRITISH COLUMBIA - Kelowna: Opportunity for associate with a view to purchase. Established, productive practice, great location, new equipment, computerized (Byte). Fun staff and pleasant environment. Tel. (250) 764-8509 (res.); PO Box 29104, Okanagan Mission, Kelowna, BC V1W 4A7 D304

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D367

MANITOBA - Oakbank: Part-time associate wanted for modern, rapidly growing practice. This attractive office is located 20 minutes from Winnipeg, in a rapidly growing family oriented town. Successful candidate must be highly motivated, caring, gentle and like working with children. A minimum of 2 years experience is required. Tel. (204) 989-2231, please leave message. D278

NORTHWEST TERRITORIES - Hay River: Canadian-certified associate required for busy, modern, well-equipped family practice. Fully qualified and experienced staff.

Opportunity to travel to outlying communities. We are seeking a motivated, caring individual who works to a high standard and is prepared to make a long-term commitment. This is an ideal opportunity to generate a high income under excellent clinical conditions. Please call Dr. Joe Keates, (867) 874-6663 or fax (867) 874-2130. D363

NORTHWEST TERRITORIES: Canadian-licensed dentists - we have associate opportunities in our Norman Wells and Inuvik clinics and rotational opportunities with mobile dental teams serving remote aboriginal-based settlements. These are excellent opportunities for motivated, practical-minded dentists with administrative skill and wide ranging operational skill. Please forward your resume and a covering letter to: Box 1360, Inuvik, NT X0E 0T0, or by fax to (867) 777-2774, attention Manager. D340

NORTHWEST TERRITORIES - Yellowknife: Canadian licensed dentists. Full-time associate position available in Yellowknife. Modern, computerized, centrally located clinic. Travel to outlying communities necessary. Exciting opportunity. Forward resume to: PO Box 2615, Yellowknife, NT X1A 2P9 or fax (867) 873-5032. D267

NORTHWEST TERRITORIES - Yellowknife: Canadian certified dental associate required for a modern family dental practice with pleasant support staff. The clinic is located in the city of Yellowknife. Seeking a caring motivated individual interested in a long-term position. Please reply to: CDA Classified Box # 2705. D012

ONTARIO - Cambridge: Oral maxillofacial surgeon - excellent opportunity! Full or part-time in well-established, new facility, multispecialist office. Growing community of 102,000. Associateship available. Please contact: M. Viol, tel. (519) 623-3810 or fax (519) 623-1760. D361

ONTARIO - Hamilton Mountain: Part-time associate required for progressive group practice. This position involves evening and weekend hours and will lead to full time/partnership for the right candidate. Please forward resume to: Mountain Mall Dental Office, 673 Upper James St., Unit 46, Hamilton, ON L9C 5R9 or call Shirley at (905) 387-4780. D362

ONTARIO - Sarnia: Experienced associate dentist required to work with me in a well-established, high-gross family dental practice. We are an up-to-date and progressive office with emphasis placed on esthetic dentistry. This is an outstanding

opportunity for the right candidate to become a future partner/purchaser. Our office is a large, spacious facility with all modern updates and a warm and friendly long-time staff. Our practice is pursuing the esthetic end of dentistry and an associate is needed to handle routine day-to-day dentistry while gaining experience in the cosmetic field. I am looking forward to meeting someone already experienced who is interested in this long-term, interesting position. Please contact: David M. Rapaich, DDS, 230 North Vidal St., Sarnia, ON N7T 5Y3; tel. (519) 336-1270 or fax (519) 336-5107 or e-mail king-pin@ebtech.net D365

ONTARIO - Kanata/Ottawa: Newly established, multidisciplinary office looking for dentist with experience in major restorative and endodontic treatment. Urgently needed for part-time to full-time hours in busy Ottawa area. Reply to: CDA Classified Box # 2756. D349

ONTARIO - Niagara-on-the-Lake: Solo practitioner with successful leading-edge facility in Niagara-on-the-Lake searching for full-time associate, possibly with view to an eventual buy in. Our attractive free-standing building, located on an acre of landscaped grounds, has state-of-the-art equipment and facilities inside. If you are confident, skilled and caring we would like



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D364

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Tawam Hospital, PO Box 15258, Al Ain, Abu Dhabi, UAE
Tel: +971 3 677410 / Fax: +971 3 671228
Email: wed1215@emirates.net.ae

D357

to speak with you. Please call Anne, (905) 468-2128, Monday to Thursday. D336

ONTARIO - Toronto: Cost-sharing opportunity. Looking for dentist with existing patient base who wishes to relocate in downtown Toronto practice. Excellent staff, strong hygiene program. Across from the Faculty of Dentistry. For further information, please contact: Karen, tel. (416) 597-0411. D279

SASKATCHEWAN - Moosomin: Locum dentist required for maternity leave, April 1, 1999. Well-established, busy family practice in new facility, equipped with panorex/ceph unit. Hygienist and therapist on staff. Moosomin is a progressive town located on the Trans Canada Highway, 2 hours east of Regina. Please reply to: Dr. P. Biglow-Lecomte or Marie, tel. (306) 435-3080 (days), (306) 435-2901 (evgs.) or fax resume to (306) 435-2017. D375

YUKON TERRITORY - Whitehorse: Associate required for a five-chair dental clinic. We are looking for a person committed to quality dentistry and interested in a long-term relationship. Tel. (867) 668-4618, fax (867) 667-6824. D358

YUKON TERRITORY - Whitehorse: Quality living at it's best. Full-time associate wanted for busy five-operator practice. Fully computerized, pan/ceph and highest quality of care. Newly renovated with an excellent working atmosphere. Enjoy working in a friendly environment while experiencing the beauty of the great north. Please fax or mail resume to: Pine Dental Clinic, 5110 - 5th Ave., Whitehorse, YT Y1A 1L4; fax (867) 668-5121. D330

Positions Sought

ALBERTA - Calgary: Dentist with 10 years experience seeking late fall associateship (full time/part time) in Calgary or area. Reply to: PO Box 75009, Cambrian Post Office, 728 Northmount Dr. NW, Calgary, AB T2K 1P0. D326

ONTARIO - Niagara Region: Associateship wanted. Experienced general dentist available for full-, part-time or locum practice. Please call Geoff Smith, (905) 468-4985. D307

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L2T 2L6 fax: (905) 227-5600
tel: (905)227-7007 attention: Grace

D351

**As a health
professional,
do you provide a
literacy-friendly
environment?**

Such an environment would include:

- a staff alert to signs of literacy deficiencies
- provision of clear, simple print materials
- non-print information using pictures, symbols, verbal instructions, video, etc.
- a referral system to literacy agencies

**En tant que
professionnel de la
santé, cherchez-vous à
créer un environ-
nement favorable à
l'alphabétisation?**

Cet environnement devrait comporter :

- un personnel prompt à détecter les signes de déficiences en matière d'alphabétisation
- la fourniture d'un matériel imprimé clair et simple
- une information non imprimée utilisant des images, des symboles, des instructions verbales, des vidéos, etc.
- un système de mises en rapport avec des organismes d'alphabétisation

A message from the Canadian Public Health Association National Demonstration Project on Literacy and Health supported by the National Literacy Secretariat, Department of Multiculturalism and Citizenship



Un message du Projet national de démonstration sur l'alphabétisation de l'Association canadienne de santé publique, parrainé par le Secrétariat national de l'alphabétisation au ministère du Multiculturalisme et de la Citoyenneté



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Continued from page 684

guidelines and standards of practice, the amalgam controversy, and increasing political and legal intrusions into our practices.

The business of dentistry: marketing, the Internet, decreasing levels of profitability, practice management, managed care, and methods of determining fair fees.

Philosophical topics: the growth of "non-traditional" methods of treatment, the ethics of "selling" dentistry or various treatment modes as "profit centres," the conflicts of interest posed when expensive new technology is purchased, "treating the insurance plan" instead of the patient, the decision whether to provide less than standard treatment under government programs or to not participate at all.

Infection and hazardous waste control — Biofilm, universal precautions: what's reasonable and what's overkill, hard evidence vs. media hype and uneducated hysteria, costs vs. effectiveness, hazardous waste disposal.

Research and good scientific papers with emphasis on what separates it from poor research, meta-analyses, and evidence-based dentistry. Emphasis on areas where all of the above are replacing old practices based on "the common wisdom," as well as cases where the former proves and supports the latter.

I'd also like to see anything that speeds up the gravitation of dentists onto the Internet. It's happening, but far too slowly. The CDA *Journal* can help by publishing short "gems" each month garnered from the Internet. It might answer the question of what use the Internet is to practising dentists.

Peter Neilson, DDS
LaSalle, Ont.

Editor's comment

I thank Dr. Neilson for his comprehensive set of suggestions about topics that we should deal with in the *Journal* and *Communiqué*. I will certainly follow up on these sugges-

tions and seek authors to write about these matters which seem to be important for most dentists.

Based on this letter, I would like to issue some invitations.

1. I invite readers who wish to write articles on any of these topics (either science-based or opinion) to contact me with their ideas.
2. I invite all readers to send me their suggestions about material we should cover in the *Journal* and *Communiqué*. If you make suggestions and we follow up on them, we can have publications that are relevant to your needs.
3. I'll wager that every day in Canada dozens of dentists telephone other dentists seeking advice about clinical and practice management problems. If we could write up some of those telephone conversations, we would have very interesting Question & Answer columns in the *Journal* and *Communiqué*. I invite you to send me written versions of some of these conversations. Shared wisdom can heighten the sense of community in our profession.

Journal

I enjoy reading your editorials and agree with many of your thoughts and opinions. I would encourage you to proceed with the delicate task of remaking the elephant. I wish to express as well my appreciation to the SLA Program and hope that it continues to be a monthly feature in the *Journal*.

Michael Aziz, B.Sc., DMD
Beaconsfield, Que.

Erratum

The *Journal* published a letter by Dr. Ed Pollak of Toronto in the July/August edition. We inadvertently spelled Dr. Pollak's name incorrectly and failed to include an earned qualification (FAGD) after his name. The *Journal* apologizes for these oversights.

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Journal

November
1998
Vol. 64
No. 10

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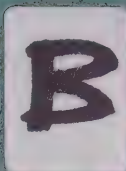
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Journal

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Are Dentists Overtreating Their Patients?

Predictably Restoring Endodontically Treated Teeth

Dental Cements: A Further Update

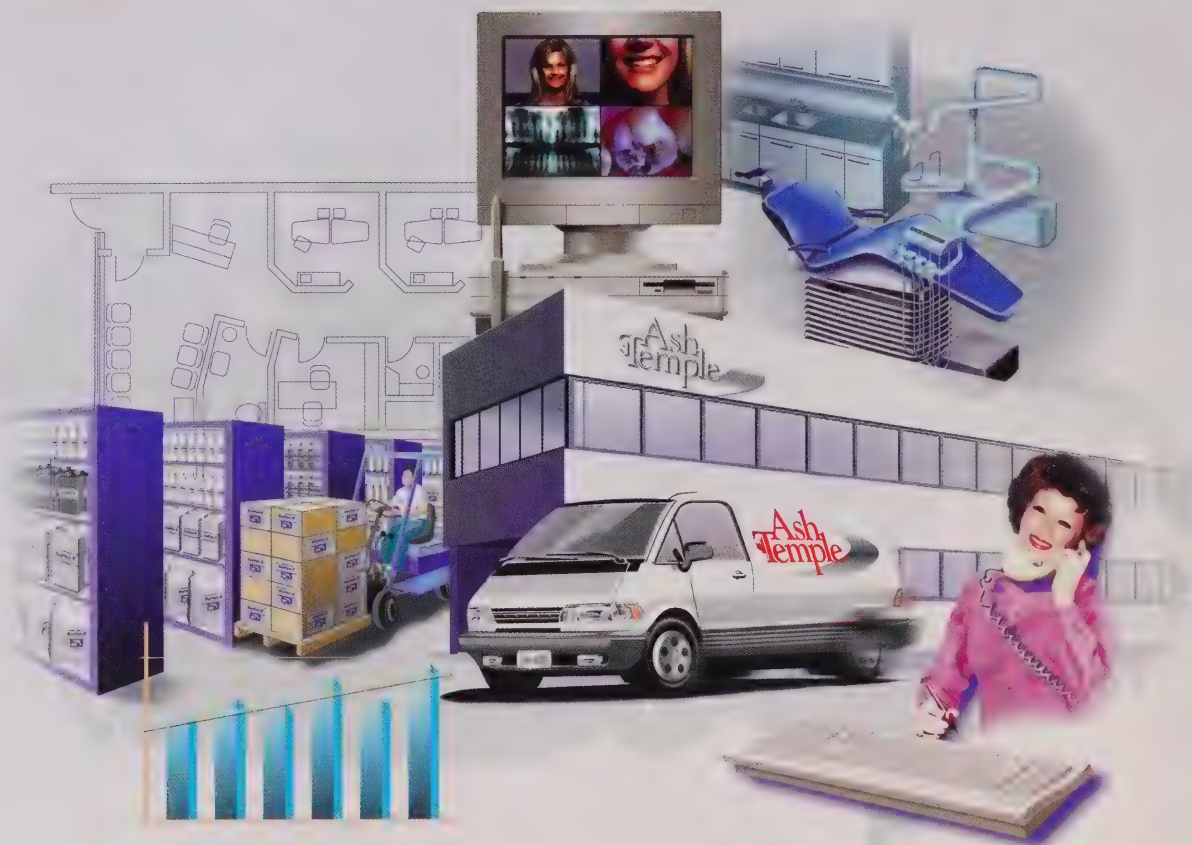
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Published 11 times per year (July-August combined) by the Canadian Dental Association at 1815 Alta Vista Drive, Ottawa, ON K1G 3Y6.

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Subscriptions are for 11 issues, conforming with the calendar year. All 1999 subscriptions are payable in advance in Canadian funds.

In Canada — \$50 (+ GST); United States — \$72; all other — \$80.

Notice of change of address should be received before the 10th of the month to become effective the following month.

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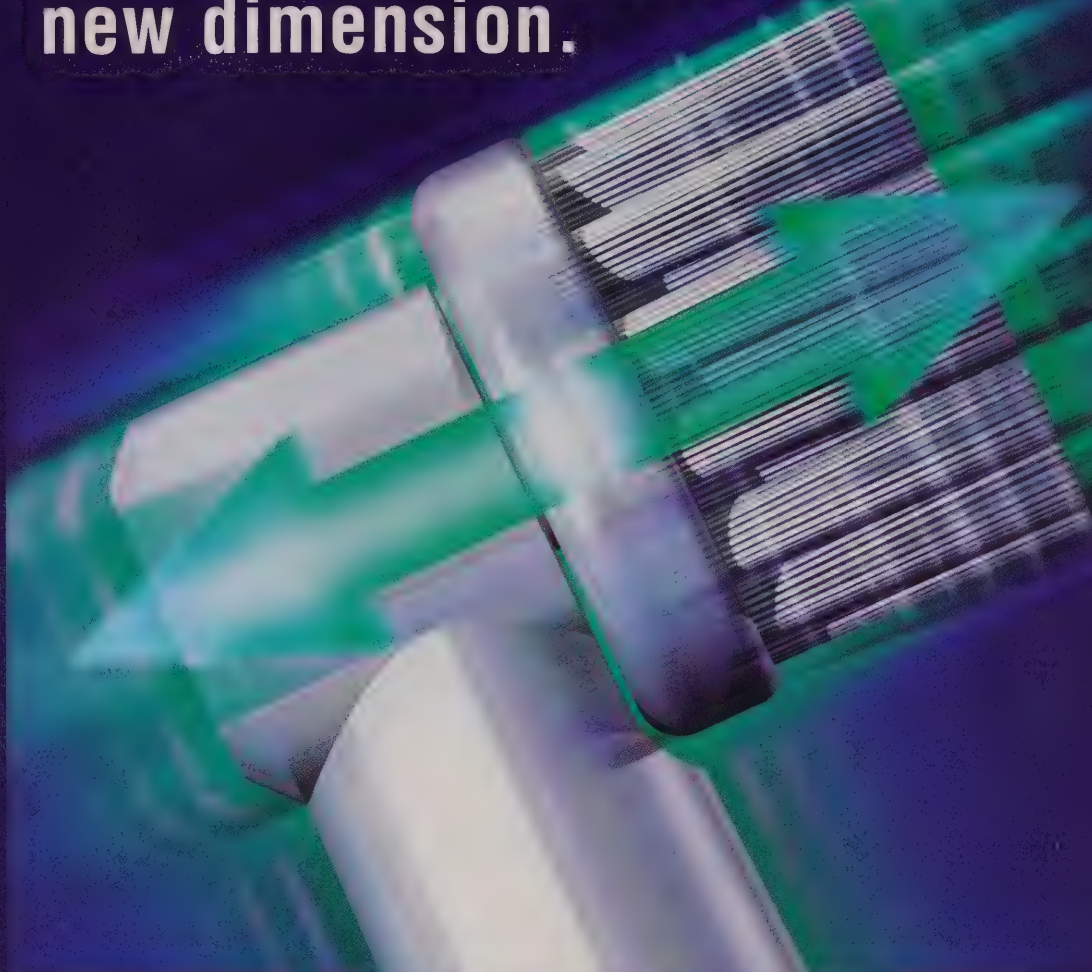
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Canadian Dental Association

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VOL. 64, No. 11

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The *Journal of the Canadian Dental Association* is published in both official languages — **except scientific articles which are published in the language in which they are received**. Readers may request the *Journal* in the language of their choice.

ISSN 0709 8936
PRINTED IN CANADA



Cover photo: "Aurora Borealis at the 50th Parallel (Lake Watshishou)," by Dr. Henri Laliberté



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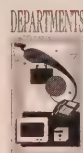
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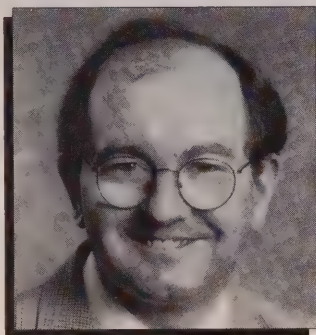
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EDITORIAL

1998: PRIDE IN THE FACE OF ADVERSITY



Dr. John P. O'Keefe

I can't help thinking that our profession took quite a lot of criticism from the media and citizens' groups during the past year. There was the *Marketplace* program and the *Reader's Digest* story, the amalgam class action suit and the fluoridation plebiscite. If a Martian came to Canada this year, he might be forgiven for thinking that dentists hadn't much to be proud of.

I was left with a distinctly different impression in my travels during 1998. Attending conventions, visiting dental schools and meeting colleagues, I spoke with many dentists who care passionately about providing quality care for their patients. The commitment to upholding the highest standards of professionalism and maintaining the dignity of the dental profession runs deep. Dentistry is a very proud profession, and I don't think anybody should forget that.

The culture of professional pride is instilled early in the career of dental students. Judging the CDA/Dentsply Student Clinician competition in Toronto in May, I was struck by the high calibre of the table clinics, and the eagerness of the students to share their knowledge. Without exception, the competition entrants were

knowledgeable, articulate and well turned out. The future of our profession is secure with such bright young members entering its ranks. Dr. Louis Dubé and I had a very difficult task in choosing a winner, so high was the standard across the board.

The pride in the profession also remains long after retirement. Probably the most poignant occasion of my year at CDA was the night that Dr. Michael Maguire received the honorary life membership of the Newfoundland Dental Association in June. The fact that Dr. Maguire hadn't been in the best of health in recent years did not prevent him from delivering an inspiring acceptance speech, in which he called on all present to maintain the highest standards expected of professionals. During the standing ovation that greeted his speech, I had tears in my eyes, and I was not alone.

The ideal health professional constantly seeks new knowledge to ensure excellent care is delivered to patients. I believe that I witnessed this ideal in action recently here in Ottawa. The Bytown Dental Study Club spent a day with Dr. Don Brunette, of the UBC Faculty of Dentistry, exploring how to assess the quality of dental literature — surely a very important skill to develop. The dedication of this group of dentists to pursuing knowledge impressed me greatly.

There are many such groups of dedicated professionals across the country. Dr. Alex McLean did the ground work for his articles on endodontically treated teeth as part of his study club involvement. I am convinced that the members of study clubs can be very valuable sources of material for publication in the *Journal*. I look forward to making contact with more study clubs across the country in 1999.

During the past year, the *Journal* has strived to be a reflection of all that is best in Canadian dentistry. Many of you have said nice things about the changes that

are coming about in the publication. I thank you for these comments. I also thank the people who have criticized some of our efforts, sometimes in quite strong terms. Such feedback keeps us, at the *Journal*, on our toes and provides us with an incentive to learn and improve.

The coming year will certainly be packed with learning opportunities. In 1999, CDA's Publication Review process, which may recommend significant changes to the way the *Journal* operates, will be completed. The paper edition of the *Journal* will get a new look. The electronic *Journal* will improve and expand.

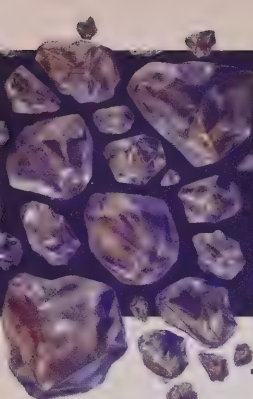
Speaking of electronic publication, I read that the electronic edition of the *Annals of Thoracic Surgery* (a surgery journal) uses multimedia to demonstrate new surgical techniques. I look forward to the day when the eJCDAs presents video clips of dental techniques. I invite authors of technique articles to consider sending us video clips accompanied by sound commentary on the procedures described in their articles. Given the quality of video and sound that can be transmitted across cyberspace these days, I think we could revolutionize the role of CDA as a provider of continuing education for Canadian dentists.

The fact that I can speak about the *Journal* in such optimistic terms is a testament to the foresight, skill and dedication of Dr. Ralph Crawford, my predecessor, who did so much to develop the publication between 1988 and 1997. Drs. Robert Turnbull and Pierre Desautels also deserve our thanks for overseeing the scientific and clinical content of the publication over many years. To these gentlemen, to our authors and reviewers, our readers and staff, I wish a happy and healthy holiday season and a prosperous year in 1999.

John O'Keefe
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Journal

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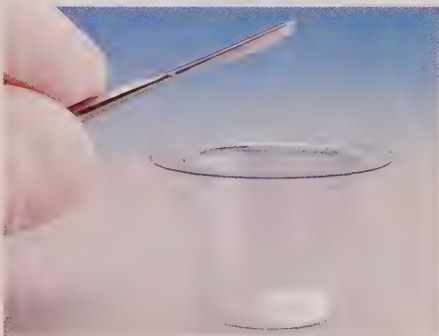
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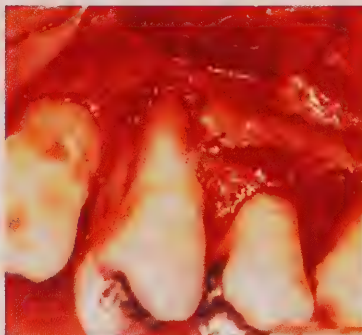
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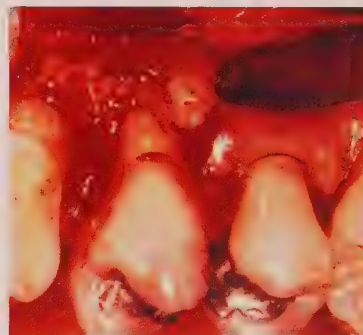
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PRESIDENT'S COLUMN

A LOOK AT THE FUTURE



Dr. Richard Sandilands

One of the most exciting aspects of my work as president of CDA is the opportunity given to me to communicate with a broad spectrum of professionals across the country, and on a few occasions, to attend international meetings. Discussions often centre on the latest technological changes affecting the profession, evolving demographics, the economic climate, and government regulations. Interestingly, these discussions are not only initiated by senior members of our profession, but also by new dentists who are obviously looking ahead to the future.

At CDA, we are looking at changes affecting all aspects of our profession. As we prepare to enter the 21st century, we are confronted with an increasingly hostile environment. To ensure a proactive response to forces beyond our control, and to capture and identify new opportunities, we must anticipate these changes. One way to achieve that is to do an "environmental scan," which is the methodology that Dr. Perry Kinkaide, of KPMG, used to help facilitate the CDA's annual planning session. At the planning session, there was much discussion on several vital issues facing

the profession today, including the following.

Technology in dentistry is revolutionizing the way patients are diagnosed and treated. New graduates especially are faced with difficult decisions regarding the selection of technologies that will meet the needs of their patients, yet will still allow them to control their office overhead. These decisions, which many dentists will eventually have to make, involve not only sound financial planning, but also an understanding of new technologies and of the research which outlines their efficacies.

Linked to this notion of staying ahead is the concept of continuous learning. It is important to find time to sift through and assimilate the incredible amount of data we receive every day, especially as information sources continue to expand (e.g., the information available on the Internet today).

Demographics in this country are changing rapidly and bringing about new expectations and treatment requirements. By the year 2000, approximately 50% of Canadians will be visible minorities. In the next century, Canada will attract massive numbers of immigrants due to its huge potential to provide space, food and a high standard of living. We will have to be in tune with the expectations of these populations. We will also have to balance the needs of our aging population, which is increasing, with those of our younger clientele. The issue of values versus costs applies to all of these demographic groups and will have an impact on the traditional standard of care we have been used to dispensing.

The current economic climate is also cause for concern, as indicated by the ever-present spectre of managed care and the decrease in federal health programming. On a personal level, dental students and professionals are constantly aware of the necessity for greater efficiency and lower cost structures as they face high tuition

fees as well as provincial and national association fees.

Finally, there is the issue of government regulations. Across the country, provincial governments are passing legislation aimed at "levelling the playing field," which often results in a broadening of the scope of practice of auxiliary groups with little consideration for the educational requirements needed to meet oral health care standards.

As you read this, you may be asking, "Why should I care about the future?" Of course, if you plan to retire in three to five years, you may not have to deal with these issues. If, however, you are in the middle of your career, then you need to reread this column, because you will feel the impact of these trends.

There is no doubt in my mind that there are substantive changes looming on the horizon. The purpose of the CDA planning session is to determine how organized dentistry must position itself to meet these challenges and to prioritize our budget accordingly. As many of you know, the urgency of the issues facing health care in general, and organized dentistry in particular, is very real.

It is my belief that with a renewed focus on collaboration and cooperation, CDA will be able to work with its corporate partners in organized dentistry for the benefit of all of our membership. We want CDA to enter the 21st century with a strategy designed to keep our profession at the forefront of technological, demographic, and professional changes. I look forward to your input regarding this vision for our future.

For those of you who celebrate this festive season, Merry Christmas, Joyeux Noël, Happy Hanukkah. My wife Marj and I wish you all the best for the coming year.

Richard Sandilands, DDS
President of the Canadian Dental Association

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1998
Vol. 64
No. 11

LETTERS



Editor's Comment

The *Journal* welcomes letters from readers about topics that are relevant to the dental profession. The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the Canadian Dental Association. Letters should ideally be no longer than 300 words. If what you want to say can't fit into 300 words, please consider writing a piece for our "Debate" feature.

CDA Journal

Congratulations on the latest issue of the *Journal*. I thought the layout was superb and the structured abstracts are a significant improvement. Informative abstracts such as those now used in the *Journal* allow one to readily assess the relevance of the particular piece of research to one's own practice. The inclusion of the MeSH headings is most helpful in searching for related papers and is greatly appreciated.

There is real need for a "scientific" journal in Canada. I believe there is great potential for the CDA *Journal* to meet this challenge. I wish you well in your endeavours.

Susan Sutherland, DDS
North York, Ont.

I have been thrilled with the modifications to the *Journal*. I was very pleased with the July/August issue — the layout of our article on antibiotics was excellent.

Unfortunately, I was less than enamoured with the layout of the September issue, in particular with the handling of our article on cuspid exposure. The photos were

treated in an excellent manner, but the article was ruined by the appearance of two full pages of colour ads right in the middle of our paper. This looks most unscientific and pulls us down to the level of a commercial enterprise like *Oral Health*. We have chosen to place more of our scientific papers (articles that could also be published elsewhere) in the CDA *Journal* with a view to giving the *Journal* a more scientific flavour. The *Journal's* staff must also do their part.

I hope we won't have a repeat of such an unfortunate occurrence.

George K.B. Sándor, MD, DDS,
FRCD(C), FRCS(C), FACS
Toronto, Ont.

Editor's comment

Dr. Sándor raises a very important point about the presentation of scientific articles in scientific journals that is dear to my heart. I understand his frustration and would like to guarantee him that we will do everything to ensure the problem will not recur.

Art

How refreshing to have a journal which now refrains from displaying dancing forceps or a mouth full of bathroom tiles on its front cover. Indeed the elephant is starting to turn.

How unfortunate, that as a result of this laudable move, we now enjoy the biscuit tin and greeting card end of the art spectrum.

The *Journal* may not be the forum for a discussion on the nature or purpose of art, and I note your editorial dilemma of having to be progressive and conservative. It is my view that if the profession wishes to project an image of modernity and forward thinking, the *Journal* is a vehicle for that message. I have seen a pile of blankets described as art. The country acquired *Voice of Fire* some years ago for a considerable sum of money. In this vein, I

respectfully submit a photograph of a snow sculpture entitled *Thunder on the Tundra* that was completed after a blizzard in 1997.

Charles Pastori, DDS
Iqaluit, Nunavut



Thunder on the Tundra

Updating a Christmas Classic

One of my patients penned this version of "The Night Before Christmas" by Clement Moore. Our office thought it could be appropriate for the December *Journal*. The author, Judy Randall, was a Starbucks manager; I have her permission to send the poem in.

*'Twas the night before Christmas
and all through the clinic,
Not a dentist was stirring, not even
the hygienist.*

*All the drills were hung on the cart
with care,*

*In hopes that the Tooth Fairy soon
would be there.*

*The patients were strapped real
tight in their chairs,*

*While visions of root canals gave
them a scare.*

*When out in the mall there arose
such a clatter,*

*Everyone put down their tall, non-
fat lattes to see what was the matter.*

*When what to their wondering
eyes should appear,*

*But a miniature sleigh, and eight
tiny reindeer.*

*With a little old lady with wings
and a wand,*

*They knew that the Tooth Fairy
had finally touched ground.*

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"Now Molar, now Canine, Bicuspid and Incisor.

On Floss, on Fluoride!" she screamed as she hit the floor.

She took out the desk, she broke through the walls.

"Now brush away, brush away, brush away all!"

Down the hall the dentist came with a bound,

To find the Tooth Fairy not making a sound.

He had to look closely, thinking it an illusion,

For he noted the Tooth Fairy had a malocclusion.

They made an appointment, but not the next day!

And here's what she said as she jumped on her sleigh,

"Merry Christmas to all, and to all a Good Bite!"

There seems to be more reader interest in the *Journal* — keep it up!

Peter Kearney, DDS

West Vancouver, BC

CDA Membership Benefits

I would like to respond to the letter from Dr. David Petrie ("Paying for the Benefits Provided by CDA," *J Can Dent Assoc* 1998; 64:614). While I cannot argue with his facts, I believe that I can offer another perspective.

He is correct in stating that there are many dentists in Canada who appear to receive the benefits of CDA membership without having to bear the full cost. This is indeed an unsatisfactory situation. I understand that he may question who is the wiser of the two groups.

I prefer to see my CDA membership as a responsibility inherent in my choice of profession. While membership has its privileges, membership in the profession should carry with it some obligations and responsibilities. One of these is to ensure that the issues which are important to my profession and to the population at large are dealt with in a proactive manner. Dr. Petrie mentioned only a few of these issues. The fact that there are dentists in this country who do not feel an obligation

to their profession gives me serious concern.

Dr. Petrie has every reason to feel pride that he, as indeed all dentists in New Brunswick, have assumed their professional responsibilities. In fact, one of the not so minor benefits of membership is precisely the ability to have input into all of the issues he mentioned.

Should Dr. Petrie's discontent grow into a general malaise, then our ability to serve both the profession and the people of Canada will be seriously hindered. Who would provide these services if more and more dentists felt they could shirk their responsibilities? For too long we have tried to "sell" membership in the CDA as something that brings with it benefits. Maybe it's time to put the emphasis on the debt we owe to dentistry.

While I am involved in organized dentistry, I will do my part to increase membership in CDA. I am not naive about the challenge this represents, but even if there is one dentist out there who feels he or she can exist in a vacuum and ignore his or her responsibilities, then the work must continue.

Take heart, Dr. Petrie, the glass is half full. You and those like you have answered the call and have earned my respect.

Alfred Dean, DDS

New Waterford, NS

Translating Dr. Kenny's Letter

Further to Dr. David Kenny's letter in the July/August 1998 issue of the *Journal*, allow me to draw your attention to a few critical inaccuracies in the French translation of the letter.

- 1) "Root canal treatment" was translated as "traitement radiculaire." Those who know all about this will understand that these two expressions refer to an endodontic treatment and a periodontic treatment respectively. In my opinion, the correct translation for "root canal treatment" should have been "traitement de canal" or "traitement canalaire."
- 2) Further on in the letter, "vital pulp" was rendered by "pulpe

vitale." The dictionary definition of the word "vital" refers to something which is a manifestation of life (e.g., vital signs). A more accurate translation of "vital pulp" would have been "pulpe vivante."

- 3) Finally, the translation of the expression "dents temporaires" toward the end of the letter is obsolete: the term "temporaire" is no longer in use, nor are the terms and expressions "quenottes," "dents de lait" and "dents de bébé." Moreover, Dr. Kenny did not use the word "temporary" in his letter; the word he used was "primary." The appropriate translation would have been "dents primaires."

As far as the content of the letter is concerned, I will let my colleagues correct the insidious errors conveyed by Dr. Kenny. The ferric sulphate study to which he refers is nothing but a red herring to divert attention from the fact that he simply wants to officially, but skillfully, justify the practice of ferric sulphate pulpotomy. By sheer coincidence, the honorarium allowed by subsidized dental care plans is higher for pulpectomy than for (formocresol) pulpectomy. I will let you draw your own conclusions while insisting, however, that this information is not included in his letter to the editor of the *CDA Journal*.

J. Victor Legault, DDS

Montreal, Que.

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NEWS UPDATE

Study Links Alcohol Intake and Upper Digestive Tract Cancer

A study published in the *British Medical Journal* (BMJ) has found that beer and spirits — but not wine — raise the risk of upper digestive tract cancer (oropharyngeal and oesophageal). The increased risk is due to the exposure of the surfaces of the oropharynx and of the oesophagus to high concentrations of alcohol such as beer and spirits. Wine, however, contains several components with possible anticarcinogenic effect including resveratrol, which has been shown to inhibit the initiation, promotion and progression of tumours. The BMJ study concludes that a moderate intake of wine probably does not increase the risk of upper digestive tract cancer, whereas a moderate intake of beer or spirits increases the risk considerably. To view the complete study, visit the BMJ site at: www.bmj.com/cgi/content/full/317/7162. ■

Canadian Researchers Win IADR Awards

Three Canadian researchers have won prestigious awards from the International Association for Dental Research (IADR) in 1998. Dr. David Locker, professor and member of the faculty of dentistry at the University of Toronto, was named the recipient of the Behavioral Science and Health Services Research Award. Dr. Locker earned his bachelor of dental surgery from the University of Sheffield and his PhD in sociology from the University of Kent (both in England). He has made landmark contributions in oral health outcomes measurement, the relationships of socio-economic inequalities to oral health, oral disorders in older adults, and dental anxiety among the elderly. Sponsored by the John O. Butler Company, this award is one of 15

Distinguished Scientist Awards conferred annually by the IADR.

Also receiving recognition from the IADR this year were Michael Glogauer, of the University of Toronto, and Harold Bobier, of the University of Western Ontario, both winners in the Edward H. Hatton Competition. The competition is designed for junior investigators who exhibit potential for a productive career in dental research. Dr. Glogauer placed first in the post-doctoral category for his research on "The Role of ABP-280 in Integrin-dependent Mechanoprotection," while Mr. Bobier came in second in the pre-doctoral competition for his research on "Signalling by Parathyroid Hormone-derived Peptides in Osteoblastic Cells."

The awards were presented in June at the IADR's 76th General Session and Exhibit held in Nice, France. ■

Telehealth Dentistry Has Arrived at the University of Alberta

October 28 marked the opening of the Dentistry/Pharmacy Telehealth Centre at the University of Alberta. A full day of demonstrations showcased the telehealth technology for the profession, the university, the public and the press. The Dentistry/Pharmacy Telehealth Centre has come about as a result of the generous donation of the newest in video-conferencing equipment from SONY Corporation. The high-resolution



"Aurora Borealis at the 50th Parallel (Lake Watshishou)"

Cover artist: Dr. Henri Laliberté

This month's featured artist is Dr. Henri Laliberté, a dental surgeon practising in Rock Forest in the Eastern Townships of Quebec. Dr. Laliberté enjoys travelling to northern climes to hunt, trap and fish. He also likes to observe nature and to capture its beauty through painting and astrophotography. It was during one of his expeditions in northern Quebec last February that he photographed the aurora borealis shown on the cover. On the night he took the photo, the mercury dipped below -40°C.

Dr. Laliberté's photograph won first prize in the astrophotography contest of the Mount Mégantic Festival of Popular Astronomy (Aurora Borealis category). To capture the natural phenomenon, he used an Olympus OM-1 camera with a 28 mm lens and a 800 ASA film for a 30-second exposure. ■

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The International College of Dentists Names Officers and Fellows

In May, the Canadian Section of the International College of Dentists named its officers and fellows for 1998. Pictured from left to right: *Front row:* Drs. M.J. Sigal, Toronto, Ont.; M.M. Fitch, Unionville, Ont.; Filip Cappa, London, Ont. (registrar); J.F. McMullan, Westmount, Que. (immediate past-president); George H. Peacock, Saskatoon, Sask. (president); D.A. Stewart, North York, Ont.; M.A. Buetner, Winnipeg, Man.; W.J. Jenkins, Toronto, Ont.

Middle row: Drs. D.J. Sweet, Vancouver, B.C.; D.R. Kramer, Toronto, Ont.; R.D. Jaworski, Sudbury, Ont.; H.M. Stein, Scarborough, Ont.; P.V. Goldberg, Dallas, Texas; M. Schwartz, Montreal, Que.; L. Hamburg, Ottawa, Ont.; A.R. Milnes, Kelowna, B.C.; L.A. Chapnick, Toronto, Ont.; D.A. Hayward, Brandon, Man.; M. Steinberg, Côte-St.-Luc, Que.; C.G. Ibbott, Regina, Sask.; M.B. Wood, St. Thomas, Ont.; J.B. Clark, Tillsonburg, Ont.; W.M. McKechnie, Swift Current, Sask.; M.M. Wainwright, Vancouver, B.C.

Back row: Drs. I. Margolese, Westmount, Que.; W.T. McGaw, Edmonton, Alb.; S.M. Jacobson, Toronto, Ont.; D.L. Rife, North York, Ont.; Y. Poulin, Quebec, Que.; R.J. Nelson, Burnaby, B.C.; T.A. Shapero, North York, Ont.; F. Turchet, Toronto, Ont.

Missing: Dr. B.H. Korzen, Toronto, Ont. (fellow); B.Gen. Victor J. Lanctis, Rockliffe Park, Ont. (president-elect); Dr. J. Roy Thordarson, Vancouver, B.C. (vice-president); Ms. Donna M. Brode, Windsor, Ont. (treasurer).

diagnostic cameras, computers, monitors and video equipment will enable dental professionals to deliver diagnostic, consultative, teaching and research services to a wide range of populations living in remote areas. The SONY system is the final link in the University of Alberta's Telehealth Technology Research Institute, joining existing systems in medicine, nursing and rehabilitative medicine.

Telehealth dentistry will allow for advanced audio, video and computer technology to transmit

information about patients over great distances. Photographic images, radiographs and other diagnostic information can be transmitted, facilitating interaction, consultation, referral and treatment recommendations. This technology will not only support individual patient needs for specialist access in remote communities, but it will also provide dental practitioners in these areas with support from dental specialists and colleagues located in urban centres. The future of dental edu-

cation will also change, as students will be able to work in a variety of distant training sites while maintaining direct contact with their dental school. (For results of a pilot study on dental screenings using telehealth technology, see page 806.) ■

The Conseil interprofessionnel du Québec Honours a Dentist



Dr. Guy Maranda

The Conseil interprofessionnel du Québec (CIQ), an organization regrouping 43 associations representing some 270,000 professionals, awarded its 1998 Merit Award to Dr. Guy Maranda. Dr. Maranda, who obtained his dental degree from the University of Montreal, began his career in oral and maxillofacial surgery in Quebec City in 1965. A founding member of the École de médecine dentaire at Laval University, Dr. Maranda has assumed, over the years, the presidency of several provincial and national organizations, including the Association des spécialistes en chirurgie buccale et maxillo-faciale du Québec, the Royal College of Dentists of Canada (RCDC) and the Canadian Association of Oral and Maxillofacial Surgeons. Dr. Maranda is a fellow of the RCDC, the International College of Dentists, the Academy of Dentistry International and the Pierre Fauchard Academy. He has been the recipient of three Certificates of Merit from CDA (in 1981, 1994 and 1996).

The CIQ acts in a consultative capacity to the minister responsible

for the application of professional laws and deals with the Office des professions et des dirigeants gouvernementaux on behalf of all professionals. The Merit Award recognizes the outstanding contribution of a professional in his or her field, and is accompanied by a sculpture created by renowned Québec artist Yves Trudeau. ■

APPOINTMENTS

Deans Named at the Universities of Manitoba and Saskatchewan



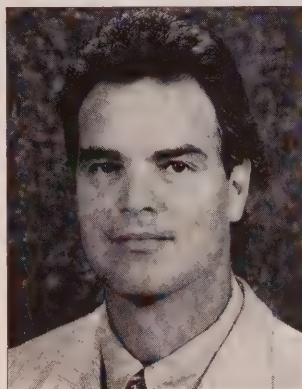
Dr. Johann de Vries

The Universities of Manitoba and Saskatchewan recently announced the appointment of new deans to their respective faculties of dentistry.

At the University of Manitoba, Dr. Johann de Vries, BChd (Hons) Oral Medicine and M.Dent Community Medicine (Pretoria), has been appointed for a five-year term as dean, faculty of dentistry. Dr. de Vries has held the position of dean of the faculty of dentistry at the Medical University of Southern Africa since 1991. He has an extensive record of teaching, research, dental education development, and professional service. Dr. de Vries was convenor of the Congress of the International Association for Dental Research (South African division). He is currently a member of the Editorial Board of the *European Journal of Dental Education*, and serves as one of fourteen Council members of the

International Federation of Dental Education Associations.

At the University of Saskatchewan, the new acting dean of the College of Dentistry is Dr. J.K. (Ken) Sutherland, professor and chair, fixed prosthodontics. Dr. Sutherland, who joined the dental faculty in 1980, has occupied the positions of head of the department of restorative and prosthetic dentistry, director of the division of fixed prosthodontics, and director of clinical affairs. Dr. Sutherland has served extensively on college and university committees as well as on the Association of Prosthodontists of Canada, the Saskatoon Dental Society and the College of Dental Surgeons of Saskatchewan. He is currently the organizational editor to the *Journal of Prosthetic Dentistry*. Dr. Sutherland is a 1977 graduate of the College of Dentistry in Saskatoon. ■



Dr. J. K. (Ken) Sutherland

The Canadian Academy of Pediatric Dentistry Appoints New President

Dr. Robert Barsky has been elected president of the Canadian Academy of Pediatric Dentistry (CAPD) for a two-year term. Dr. Barsky graduated from the University of Saskatchewan's faculty of dentistry in 1982 and obtained his diploma in pediatric dentistry from the University of Toronto in 1986. In 1998, Dr. Barsky became a fellow of the Royal College of Dentists of Canada. He is past-

president of the Alberta Academy of Pediatric Dentists. Dr. Barsky is currently in private practice in Calgary; he is also associated with the Alberta Children's Hospital.

Joining Dr. Barsky on the CAPD Executive Committee are: Dr. W.S. Cheung, Vancouver, B.C. (past-president); Dr. Ross Anderson, Halifax, N.S. (vice-president); Dr. Alan R. Milnes, Kelowna, B.C. (secretary treasurer); and Dr. J. Victor Legault, Montreal, Que. (executive director). ■



Dr. R. Barsky (right), newly appointed CAPD president, accepts an artwork from Dr. W.S. Cheung.

Alberta Dentist Elected President of the Canadian Association of Oral and Maxillofacial Surgeons



Dr. Christopher Robinson

Dr. E. Christopher Robinson is the new president of the Canadian Association of Oral and Maxillofacial Surgeons. Dr. Robinson graduated from the University of Alberta in 1973, then went on to take his training in oral and maxillofacial surgery (OMS) at Mount Sinai Hospital in New York, N.Y. Following

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WHAT'S IT?

This month's "What's It" has us really puzzled. Made of metal by S.S. White, the instrument is 13.5 cm in length and has a slotted eye at one end. What fascinates us is the piece of fine wire attached to the small knob near the needles. Is the wire there by accident or does it play some important dental role?

Anyone with insight into this mystery item is asked to please contact Dr. Ralph Crawford, c/o Dentistry Canada Museum, 427 Gilmour Street, Ottawa, ON K2P 0R5. ■



completion of the three-year program, he pursued two years of fellowship training at various maxillofacial centres in Europe. Dr. Robinson earned his designation as a fellow of the Royal College of Dentists of Canada (OMS) in 1978. He has served as assistant and associate clinical professor of oral and maxillofacial surgery in the department of oral health services in the faculty of medicine at the University of Alberta. Dr. Robinson practises privately in a group setting in Edmonton, Alberta. ■

New President of the Canadian Academy of Endodontology



Dr. Richard Hunter

Dr. Richard Hunter is the new president of the Canadian Academy of Endodontology. Dr. Hunter received his undergraduate dental

degree from the University of Toronto in 1976 and his certificate in endodontics from Temple University in Philadelphia in 1980. Currently, Dr. Hunter is a clinical associate with the teaching program at the University of Toronto. He also acts as an endodontic consultant at the Toronto Hospital and maintains a private practice in Toronto. He is past-president of the George Hare Study Club and of the Ontario Society of Endodontists.

Other officers named to the Academy in 1998-1999 include: Drs. Thomas N. Mather, Edmonton, Alta. (president-elect); Marc-André Morand, Quebec City, Que. (treasurer); William J. Kost, London, Ont. (constitution and by-laws); Raymond Greenfeld, Vancouver, B.C. (past-president); and Paul E. Teplitsky, Saskatoon, Sask. (executive secretary). ■

OBITUARIES

Carey, Dr. Edward R.: A 1972 graduate from the University of Pittsburgh's school of dental medicine, Dr. Carey, of Kitchener, Ont., died in June of this year.

Devine, Dr. James L.: A 1943 graduate from the University of Toronto's faculty of dentistry, Dr. Devine, of Orillia, Ont., died in April of this year.

Fantin, Dr. Theodore D.: A 1964 graduate from the University of Alberta's faculty of dentistry, Dr.

Fantin, of Trail, B.C., died October 10, 1998.

Harm, Dr. Olev: A 1963 graduate from the University of Toronto's faculty of dentistry, Dr. Harm, of Willowdale, Ont., died July 25, 1998.

Jones, Dr. Edward A.: A 1968 graduate from the University of Toronto's faculty of dentistry, Dr. Jones, of Ancaster, Ont., died July 21, 1998.

Jones, Dr. Robert R.: A 1952 graduate from the University of Toronto's faculty of dentistry, Dr. Jones, of Chatham, Ont., died May 16, 1998.

Loth, Dr. Anna Maria Feher: A 1976 graduate from Semmelweis University, in Budapest, Hungary, Dr. Loth, of Elora, Ont., died July 1, 1998.

Low, Dr. Vern A.: A 1960 graduate from the University of Alberta's faculty of dentistry, Dr. Low, of Rossland, B.C., died in March of this year.

Woyat, Dr. John A.: A 1960 graduate from the University of Alberta's faculty of dentistry, Dr. Woyat, of West Vancouver, B.C., died September 16, 1998.

Wright, Dr. Orville F.: A 1942 graduate from the University of Alberta's faculty of dentistry, Dr. Wright, of Vancouver, B.C., died July 30, 1998. He was a life member of CDA. ■

DEBATE



Dentistry: The Bridge Between Medicine and Nutrition

William K. Hettenhausen, DDS

© J Can Dent Assoc 1998; 64:771-2

To recognize dentistry's full potential as a primary health care profession requires a view that extends far beyond the limited focus of a purely restorative or surgical practice. Just as it is difficult to see the whole picture when you are inside the frame, it is equally difficult to see how healthy the whole body is when your focus is inside the mouth.

Dentists often remark that physicians seldom look before the tonsils, without acknowledging that they themselves seldom look beyond them. Not only can dietary or nutritional factors play a critical role in preventing recurrent dental caries or chronic periodontal disease, they can also affect the health and well-being of the whole body. If dietary patterns can greatly influence a patient's long-term health, then shouldn't nutritional assessment be an important diagnostic tool in everyday dental practice?

If we stand back for a moment, and view the mouth as the gateway to the human body, its importance as a diagnostic window becomes obvious. Everything that is eaten passes through it, and oral hard and soft tissue relationships can be used to describe both health and aging. Many subtle nutritional deficiencies first manifest their symp-

toms in the mouth, and their early or interceptive diagnosis is one of the keys to prevention.

In the mouth, it is possible to monitor the gingival vascular response to the bacteria in common dental plaque over time. By analysing the dietary patterns that enhance or impair this response, we can observe to what extent diet and nutrition play a role in preventing periodontal disease and in generating oral health.

How can the dental profession develop this diagnostic potential and share it with other professional colleagues? Dentistry can bring medical health assessment, oral diagnostics, and dietary pattern analysis together. It can provide the oral diagnostic data link to help physicians, dietitians and nutritionists prove to their patients that certain dietary patterns can profoundly influence both their dental and general health.

Why has interdisciplinary research been so slow to develop? Considering that there are 21 separate regulated health professions in the province of Ontario, is it so surprising that our view of the body and our health knowledge is divided and fragmented? Each profession has a view of health that is limited or restricted by the frame-

work of its discipline. An interdisciplinary approach is necessary and could provide a common focus enabling separate health professions to explore an integrated or comprehensive view of patients' general health. For example, the strength or level of a patient's systemic health, measured from a dental-medical perspective, can be correlated with the nutritional balance in his or her diet.

Shared Professional Values

All health professions have one thing in common: the innate desire to alleviate pain, restore or enhance health, and prevent suffering. We share the goal of learning how to generate and sustain optimal health for a lifetime. The basic variables that must be taken into account to achieve this goal are total body health, diet, nutrition, and the environment. What is needed is a dental-medical health evaluation system that can aid in assessing human health and in monitoring the nutritional impact of various dietary patterns on health over time.

How can you assess total body health? One method is to assess the strength or magnitude of the body's immune response to bacteria. The degree of soft tissue vascular

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Fig. 1: Gingival response to plaque on lingual aspect of 46.

response to chronic bacterial irritation is a measure of resistance to infection and a reflection of systemic immunocompetence.

How do you evaluate the effects of diet and nutrition on health? The ability to decide how a specific diet is affecting a given individual is dependent on the evaluation of the patient's health and based on the collection of certain data. These data can then be cross-indexed with various dietary patterns to determine which promote or impair health. Although it is possible to index systemic health with a medical laboratory blood test, to do this in response to dietary changes on a biweekly basis is simply not practical.

Dentistry is in the fortunate position of having the mouth as its diagnostic reference area. Gingival tissue vascularity or redness is a normal systemic response to the bacteria in common dental plaque (see **Fig. 1**). It indicates the extent of the body's systemic immune reaction and immunocompetence. This oral diagnostic reference point makes it possible to monitor easily the nutritional impact of recorded dietary patterns on host resistance over time. It could provide a reference point for establishing the missing diagnostic data link between medicine and nutrition and can be obtained both safely and non-invasively.

In Pursuit of the Link Between Medicine and Nutrition

Dentistry is the first of the traditional health professions to make prevention its hallmark. When clinical research at major univer-

sity dental schools revealed the etiology of dental caries and periodontal disease in the late 1960s, preventive dentistry became a scientific, evidence-based reality.

After graduating in dentistry from the University of Toronto in 1972, I returned to practise in Thunder Bay, a northwestern Ontario community of about 120,000 people. After four years of general dentistry, I decided to limit my practice to oral diagnosis, consultation, primary prevention and nutrition by referral only. Since 1976, I have seen more than 2,500 private patients and 270 full families. They have had their oral hygiene and gingival health evaluated, and their dietary patterns analysed. This longitudinal study has led to the synthesis of an integrated oral health evaluation and nutritional approach to preventive dentistry and dental health promotion.

YTFL Oral Health Evaluation System

Since 1987, the Your Teeth For a Lifetime (YTFL) Foundation has actively supported the Oral Health Evaluation System (OHES) software development and testing. A simple, menu-driven database program is used to streamline data collection and processing. Patient oral hygiene is indexed with the aid of sodium fluorescein and dichroic-filtered blue light, which help to highlight bacterial plaque accumulation patterns that are almost totally invisible to the naked eye. Gingival health is indexed using bleeding-on-probing (BOP) and periodontal pocket depth (>3 mm).

The OHES software indicates that in close to 80% of oral health evaluations, the patient's oral hygiene and gingival health are directly related. In the remaining 20%, the relationship cannot be explained in terms of local etiological factors. For this reason, patients with good oral hygiene and poor gingival health, and with poor oral hygiene and good gingival health, are targeted for dietary pattern analysis and medical health assessment. An exaggerated vascular response (redness and bleeding) to bacteria can indicate a systemic or acquired immune deficiency. A minimal vascular response to abundant bacteria can indicate a strong or healthy resistance to infection.

By examining the dietary patterns of patients presenting these two extreme types of gingival response, I have developed a Biological Concentration Perspective (BCP) theory to explain why certain dietary patterns tend to support or impair health.

Currently, we are looking for interested dentists, and a major Canadian and American university medical/dental school, to test our OHES software and interdisciplinary approach to dental-medical health evaluation research. There is a need for further study through a credible research project involving a team of dentists, physicians and nutritionists. We believe that the OHES database system software is an important first step in providing an evidence base that will establish the relationship between general health, oral diagnosis and diet. ■

Dr. Hettenhausen is the executive director of Your Teeth For a Lifetime Foundation, based in Thunder Bay, Ontario. He can be reached at: (807) 622-2600 (tel.), (807) 344-3078 (fax), or ytfl@tbay-tel.net (e-mail).

The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the Canadian Dental Association.

DEBATE



Are Dentists Overtreating Their Patients?

D. Christopher Clark, DDS, MPH

© J Can Dent Assoc 1998; 64:773-4

I was recently asked by the Canadian Broadcasting Corporation (CBC) to respond to a *Reader's Digest* special report entitled, *How Honest are Dentists?* (Sept. 1998, p. 38-44). If you haven't seen it, I recommend you get a copy. While far from scientific, it contains plenty of food for thought. And besides, your patients will see it.

At first I was reluctant to respond to the CBC's request, knowing that overtreatment is a sensitive and potentially explosive issue. I also know that my particular views might not be widely shared within the profession. However, I chose to give an interview, and it aired on CBC radio early in September.

After the fact, students, fellow academics, and professional colleagues congratulated me. Everyone seemed to think I did a good job. While what I said is as far as I can ascertain true, I failed to share my entire perspective on the issue.

To inform those of you who may not have seen the article, and the many who didn't hear the interview, I'll summarize the article and my response. A reporter from *Reader's Digest* visited numerous dentists across Canada,

asking for an examination and a detailed treatment plan and cost estimate. The results of this quasi-experiment were startling. The variety of treatment options was enormous, ranging from essentially no treatment at all to sophisticated treatment plans worth over \$10,000. Needless to say, the article reflects quite poorly on the profession.

My response attempted to place dentistry on the same level as other consumables. Certainly, in most aspects of our lives, we can opt for having the best treatment, if we value and have the means to attain that particular treatment. I attempted to explain that many dentists across Canada honestly try to provide their patients with the best dentistry that money can buy.

There's absolutely nothing wrong with this! Unfortunately, many Canadians, even those with dental plans, can't afford, or choose not to purchase some of what we have to offer. Still, many of our patients do choose to have excellent oral health, and the dental profession should be proud that this is the case for so many Canadians. However, the situation becomes problematic when we realize how many Canadians can't

afford dentistry today and how dental plans are increasingly cutting back on needed coverage.

I also attempted to describe what a cavity actually is, emphasizing that most cavities today are small and difficult to detect. I shared with the reporter my personal experience of attempting to find consistency in the examination of subjects in my own research studies. Trained examiners often classify the same teeth differently from one day to the next. It isn't because they're dishonest; it's because small cavities are barely discernable to the naked eye. Actually, dental caries in their earliest stages are only detectable microscopically, so I am not alarmed by this apparent lack of consistency.

I took this particular approach during the interview because I didn't want my comments to reflect badly on the profession. Moreover, the time and place for this discussion isn't in the media. This is a professional issue. Personally, I am greatly concerned about overtreatment, and I strongly believe that this is one of the most pressing problems facing the profession today. I am also troubled by the apparent lack of con-

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cern shown by the professional bodies regarding this issue.

I believe that many of us overtreat our patients. I also believe that for the majority of us, this overtreatment is neither malicious nor ill intended. I believe that we have let dental plans cloud our thinking and best judgment. The result is that we have structured treatment plans and marketed our services based on the payment scheme of dental plans. This approach has created a culture that may be disastrous. We really don't get very well rewarded for doing anything but surgical and front-end procedures. We also don't get reimbursed appropriately for diagnosis and treatment planning, consultations, and patient education.

I am not happy about where all of this has taken us. If you look at third-party billings to see where consumer dollars are spent, a large portion of the money apparently goes to prevention. This would include recall exams, prophylaxis (not shown to benefit the patient's oral health in any significant way), scaling and root planing, and topical fluoride treatments. However, how many of us automatically put patients on six-month recalls, especially if they have dental plans? And who gets a topical fluoride treatment? Which one do we provide, the quick and easy two-system rinse that isn't approved by CDA or one of the approved systems? Moreover, do we assess the patient's risk for dental caries before we make these decisions?

I contend that much of what is included under the umbrella of prevention is really overtreatment. To deal with this problem, we have to address the following questions: How are we really managing our patients' oral diseases? What model are we using, the surgical model of the past, or the medical model that we know is more appropriate? Moreover, where can patients get well educated about their oral health? About their diet? Where can they learn about preventing disease?

How many offices are really providing these services today?

In my own research, for example, I have come across some results that trouble me. A large study in British Columbia designed to evaluate the effects of defluoridation showed that about 60% of the participants surveyed had one or more sealants present, with a mean number of 3.2 sealants for each student examined. While at first glance this might look good, some of the numbers are better than others. Of all pit and fissured surfaces on permanent first molars, 24% were sealed. The prevalence of decayed and filled pit and fissured surfaces on these teeth was 20%. These results suggest that there is significant disease on first molars, and that perhaps we should be sealing more of these surfaces.

For the same subjects, 24% of all pit and fissured surfaces on premolars were sealed. The prevalence of decayed and filled pit and fissured surfaces on these teeth was 2.8%. These results suggest that we are sealing one quarter of all premolars when only 2% of these teeth are experiencing decay. Seems like overkill to me. It's actually difficult to know what criteria dentists or auxiliaries are using when making decisions about sealant use. Results suggest that teeth are getting sealed that have little or no potential to experience disease. The expected response is "Well, sealants don't hurt these kids!" And this may be true — sealants probably don't do any harm, but they do cost money. I contend that the system can't afford dentistry that isn't needed, especially when a third party is involved in the relationship.

My concern is based on the reality that we are experiencing some tough economic times, and that during these times, dentists get desperate. I think that this has already happened in the United States, and I'm afraid the same scenario is waiting for us if we don't get our act together.

The truth of the matter is that we're overtreating most of our patients, and those who can't

afford our services are getting farther and farther away from being able to access the system. I'm afraid that government will intercede, and then we'll have dental plans like those the government runs now. I personally don't want any more government-sponsored dental plans in my lifetime, and I expect you'll agree. I'm also afraid that if we don't recognize the problem and deal with it, we're in for some very tough times ahead. ■

Dr. Clark is chair, Division of Prevention and Community Dentistry, Faculty of Dentistry, University of British Columbia.

The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the Canadian Dental Association.

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BOOK REVIEWS

Forensic Dentistry

edited by Paul G. Stimson and
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1997, CRC Press, Boca Raton, Fla.,
287 pages plus index; B&W with 10
colour illustrations; \$79.95 (U.S.)
ISBN: 0-8493-8103-7

Eleven seasoned authors report on the handling, examination and evaluation of dental evidence for forensic purposes. Although the publisher professes to inform the dentist, the medical examiner, the pathologist, the lawyer and the police technician, readers should be advised that the text is designed to instruct the informed forensic dentist.

Techniques for determining the race, sex and age of the unidentified are suggested. Procedures and materials are explained in a comprehensive manner. The basic objectives of establishing the physical parameters against which a known can be compared are presented. Although the same objectives apply in a disaster, particular problems dealing with such situations, including management issues, are also discussed. The evaluation of bite mark evidence, child abuse and oral injuries are reviewed in the context of criminal and civil law.

Discussions on advances in DNA technology and analysis, geotaphonomy, and developments in the field of forensic photography will pique the reader's interest. The interdependent roles of the expert witness, the attorney and the court are explained. Of particular delight is a section that reveals how to deal with an aggressive attorney.

The publication includes: a) four pages of colour photographs that have little relevance to the subject matter; b) the various methods employed in forensic examination of the living and the deceased; c) the terminology and techniques accepted in examining bite mark evidence on the victim and the accused; d) the role of the dentist in detecting and preventing child abuse; and e) an excellent

summary, in Appendix A, of bite mark citations in American courts (mostly Appellate Division).

The chapter entitled "Scientific Methods of Investigation" includes atypical ancillary technologies for age determination, dental structure identification, sorting by metal ratios, and serological parameters. While the editors have included material on chemical and serological markers, salivary drug detection, and animal and sex determination in bite mark analysis, they fail to either mention or adequately explain the use of video and digital cameras, advanced photocopiers and software in the analysis, enhancement, comparison, and electronic overlays of bite marks and suspect dentition.

There is also a review of dental applications and profiling issues with the RFLP and PCR methods of DNA analysis for nuclear and mitochondrial DNA. The problems of applying DNA test results, including the adequacy of genetic interpretations, quality assurance of testing procedures and inference of unfairness to a defendant are especially interesting.

Finally, the section on forensic photography deals with the use of visible light photography (black and white, colour and fluorescent) and non-visible light (reflective long-wave ultraviolet [UVA] and infrared photography).

Appendix B contains eleven photographs (mostly bite marks) of historic case material while Appendix C cites an example of an exhumation release and retainer agreement.

Although interesting, many of the topics discussed have little to do with the everyday practice of forensic dentistry. The book is disorganized and repetitive, and contains typographical errors as well as some outdated references. The editors have also failed to impose a uniform writing style. This book will be of most use to those with advanced knowledge in forensic dentistry who can distinguish common practice issues from theory.

Forensic Osteology: Advances in the Identification of Human Remains, 2nd ed.

edited by Kathleen J. Reichs

1998, Charles C. Thomas Pub-
lisher Ltd., Springfield, Ill., 555
pages plus index; B&W illustra-
tions; \$94.95 (U.S.)
ISBN: 0-398-06804-6

This book, authored by 33 eminently qualified experts in their field, is divided into eight sections: a) introduction; b) the field of forensic anthropology; c) recovery; d) time elapsed since death; e) biological profile; f) trauma analysis; g) statistics and databases; and h) specialized techniques.

The 25 chapters encompass such diversified and non-traditional topics as human rights issues, cremains (what is left after cremation), cadaver dogs and histological techniques. The most interesting section for this reviewer dealt with the field of trauma analysis, including fracture and dismemberment. The biomechanic and microscopic effects of trauma inflicted on the bone by various saw blades and knives are thoroughly examined. Markers of occupational stress on bone, facial approximation, and historical cases enrich the contents. The question of calling someone an expert in areas of science that were previously unknown just a few years ago is also considered.

Forensic dentists and anthropologists alike will be captivated by the information described on the CD-ROM (which can be bought separately) for the assessment of age by maxillofacial, dental and skeletal development designed by the University of Montreal's faculty of dentistry professor, Dr. Arto Demirjian.

Texts of particular interest include the one by Murad, in which he discusses the cremation process, with emphasis on the variations that exist within the industry. He summarizes the impact these practices

Continued on page 826

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QUESTION 11

An otherwise healthy patient presents in your office with a history of a total hip replacement three years previously. You are planning to carry out extensive curettage because of existing periodontal disease. Current opinion is that

- A. no prophylactic antibiotic coverage is required.
- B. prophylactic antibiotic coverage is required using penicillin orally.
- C. prophylactic antibiotic coverage is required using amoxicillin orally.
- D. prophylactic antibiotic coverage is required using a cephalosporin intravenously.

ANSWER: A

RATIONALE:

It is the opinion of the American Academy of Oral Medicine that there is insufficient scientific evidence to support routine antibiotic prophylaxis for all patients with prosthetic joints who are receiving dental care. This opinion is based on the following:

- it has been observed that bacteria found in infections of the prosthetic joint are, in the vast majority of cases, different from those of the oral flora.
- at present, there is no single antibiotic which can be effective against all bacteria found in the oral flora as well as those found in the majority of prosthetic joint infections.
- the prosthetic joint is often largely avascular, and therefore the risk of a blood-borne infection is remote.
- to date, there is no demonstrated case of prosthetic joint infection induced by a transient bacteremia of dental origin.
- in a recent report¹ adopted by the American Dental Association and the American Academy of Orthopaedic Surgeons, the important conclusion was "antibiotic prophylaxis is not indicated for dental patients with pins, plates and screws, nor is it routinely indicated for most dental patients with total joint replacements."

However:

- immunocompromised/immunosuppressed patients
- insulin dependent diabetics
- patients with joint replacement in the initial two years
- patients with previous prosthetic joint infections
- patients who are malnourished, and
- hemophiliacs

may be at higher risk for hematogenous infections. Prophylactic antibiotic coverage should be considered for these patients who undergo those procedures which have a high incidence of bacteremia. These are:

- extractions
- periodontal procedures
- dental implant placement
- reimplantation of avulsed teeth
- endodontic instrumentation or surgery
- initial placement of orthodontic bands but not brackets
- intraligamentary local anaesthetic injections
- prophylaxis where bleeding is anticipated.

Practitioners must exercise clinical judgement in determining whether or not antibiotic prophylaxis is appropriate.

Table I lists suggested antibiotic prophylaxis regimens for those patients for whom prophylactic antibiotics are required.

Table I

Situation	Agent	Regimen
Patients not allergic to penicillin	AMOXICILLIN CEPHELEXIN or CEPHADRIN	2 g orally one hour before procedure
Patients not allergic to penicillin and unable to take oral medication	AMPICILLIN or CEFAZOLIN	2 g I.M. or I.V. one hour before procedure
Patients allergic to penicillin	CLINDAMYCIN	600 mg orally one hour before procedure
Patients allergic to penicillin and unable to take oral medication	CLINDAMYCIN	600 mg I.V. one hour before procedure

No second dose is required

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REFERENCES:

1. Antibiotic prophylaxis for dental patients with total joint replacements. American Dental Association: American Academy of Orthopaedic Surgeons. *JADA* 128:1004-1008, 1997.

QUESTION 12

The modern approach to the management of dental caries calls for the use of preventive strategies not just the treatment of the disease and symptoms. In this approach, you would

1. identify the infection risk level to caries.
2. control the spread of the infection with antibiotics.
3. observe for prevention of re-infection through recall.
4. avoid probing of suspect fissures or smooth surfaces.
5. remove any ditched amalgams that may be present.

- A. 1 and 2 B. 1, 2, 4, 5
C. 1, 3, 4 D. All of the above.

ANSWER: C

RATIONALE:

Clinical research has linked caries with raised levels of *Streptococcus mutans* (*S. mutans*) in plaque and implicated Lactobacilli in the advanced carious lesions. Studies also show that, by the age of 22-26 months, the mouths of children have acquired *S. mutans* organisms by transmission from parents or other care givers. Such bacteria remain for life.

Since the infectious agent of significance is *S. mutans*, this can be office-tested using methods which will identify the caries risk status. This should be followed by a general assessment of the status of fissures, other tooth surfaces and restorations to detect potential niches for the harbouring of organisms. Smooth surfaces and fissures which are suspect should not be probed since some lesions can heal by remineralization and would be surface damaged by probing. Instead, they should be examined by fibre optic transillumination or radiography. Areas harbouring organisms in fissures are eliminated by sealants and varnishes. Fluor protectors are used for smooth surfaces.

A ditched amalgam should not be replaced automatically, since this does not constitute a failed restoration. Instead, the surface can be microabraded, the enamel etched and a sealant placed.

Having removed niches of infection, the bacteria can then receive attention by use of a chlorhexidine gel. Antibiotics should not be used. Chlorhexidine is an antimicrobial agent with an ability to suppress *S. mutans* adequately in a 14-day regimen.

Following such an approach, a recall appointment in three months should ensure that the bacterial count is at an acceptable level. If not, a reapplication of chlorhexidine may be required.

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1. Caries diagnosis and risk assessment. A review of preventive strategies and management. *JADA Spec Sup* 126:IS-24S, 1995.
2. Anderson, M.H., Bales, U.J. and Omnell, K-A. Modern management of dental caries. *JADA* 124:37-44, 1993.

3. Nikiforuk, G., Ed. *The Oral Care Report* Vol. 6 No. 3, 1996.

QUESTION 13

Gingivitis in young people is most severe between the ages of

- A. 1-2 years B. 3-6 years
C. 7-9 years D. 14-16 years

ANSWER: D

RATIONALE:

In the deciduous dentition, gingivitis is uncommon. When young children stop brushing their teeth, gingival inflammation is negligible even in the presence of increased levels of plaque. It would appear that this occurs as a natural host resistance against a marginal gingivitis probably just as well since 3-6 year old children are frequently unable to brush their teeth properly. In the 7-9 year old group and the 14-16 year olds, the same amount of plaque produces a progressively greater response with increasing severity of gingivitis. The exaggerated response to plaque during pubescence results from hormonal secretions into the gingival fluid which change the substrate of the fluid and a subsequent shift of subgingival bacteria to the capnophiles.³

A recent study¹ underscores the need to identify young people (13-17 years) who are liable to develop early onset periodontitis (EOP). This condition is characterized by rapid progression of attachment loss in affected teeth with increasing numbers of teeth affected over time. There is a prevalence in African Americans and Hispanics. At present, only clinical and radiographic evidence can be used to identify these EOP patients. There is loss of attachment and alveolar bone, as detected by clinical probing and radiography. Other features are generalized overt gingival inflammation, calculus, high level of caries, restorations, and tooth loss.

Young children (3-6 years) with primary teeth and 7-9 year olds should be taught to brush at least twice a day. Although most children have neither the dexterity nor patience to floss, and even though flossing is not needed in the younger age group, the flossing habit should be established as early as possible. In older groups, brushing, flossing and regular recall to monitor plaque control are an essential preventive regimen.

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1. Albander, J.M., Jackson Brown L., Loe, H. Clinical features of early onset periodontitis. *JADA* 128:1393-9, 1997.
2. Baer, P.N. and Gomes, B.C. Periodontal considerations in children. *NY State Dent J* 43-6, 1992.
3. Genco, R.J., Goldman, H.M. and Cohen, D.W. *Contemporary periodontics*. St. Louis: C.V. Mosby Co. pp. 77, 208, 217, 260, 294, 1990.
4. Douglass, C., Ed. *The Oral Care Report* Vol. 7 No. 4, 1997.

QUESTION 14

Triclosan is

Table II

Clinical Study Parameter(s)	Duration of Studies	Number of Studies	Total Subjects in Studies	Conclusions
Plaque and Gingivitis	6 months	12	1,688	Use of a fluoride dentifrice containing triclosan and a copolymer provides a clinically beneficial reduction in supragingival plaque and gingivitis.
Calculus	3-6 months	4	435	Use of a fluoride dentifrice containing triclosan and a copolymer provides a clinically beneficial reduction in supragingival calculus.
Caries	30-36 months	4	6,300	Use of a fluoride dentifrice containing triclosan and a copolymer provides a clinically beneficial reduction in dental caries.
Microbiology	6-12 months	5	365	Use of a fluoride dentifrice containing triclosan and a copolymer does not cause the development of either pathogenic, opportunistic, or resistant microorganisms.

1. a broad-spectrum antibacterial agent
2. used in toothpastes and mouthwashes
3. able to reduce plaque accumulation
4. not effective against gram positive microorganisms

- A. 1, 2, 3 B. 1 and 3
C. 2 and 4 D. 4 only E. All of the above

ANSWER: A

RATIONALE:

Triclosan is a recognized broad-spectrum antibacterial agent which is effective against both gram positive and gram negative organisms. The primary site of action is the bacterial cytoplasmic membrane since it prevents the uptake of essential bacterial amino acids in bacteriostatic concentrations, thus stopping bacterial multiplication. In bacteriocidal concentrations, Triclosan causes cytoplasmic disorganization of the bacterial cell membrane and leakage of the cell contents.

It is widely used in soaps in hospitals because of its antibacterial properties. Lindhe¹ advocated use of triclosan in oral products (toothpastes and mouthwashes) and demonstrated the clinical value in management of oral bacteria in dental plaques.

Volpe² reported on several studies which attested to the effectiveness of triclosan in a number of varied clinical parameters in which a fluoride dentifrice containing 0.3% triclosan and a 2.0% PVM/MA (polyvinyl-methyl ether maleic acid) copolymer was evaluated. The summary and conclusions of these clinical studies are shown in Table II.

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1. Lindhe, J., Triclosan/copolymer/fluoride dentifrices: a new technology for the prevention of plaque, calculus, gingivitis and caries. *Am J Dent* 3:53-4. 1990.
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3. Douglass, C., Ed. *The Oral Care Report* Vol. 7. No. 4, 1997.

QUESTION 15

Extrinsic discolouration on teeth relies on the salivary pellicle for attachment.

Intrinsic discolouration of teeth can be countered by vital bleaching.

- A. The first statement is true, the second is false
B. The second statement is true, the first is false
C. Both statements are true
D. Both statements are false

ANSWER: C

RATIONALE:

The public's desire for a bright smile with white teeth has caused considerable research into methods for bleaching of teeth, as well as methods to remove extrinsic and intrinsic stains. A recent publication examines mechanisms for dental staining and suggests a new classification for extrinsic dental stain, viz. N1, N2, and N3.

Extrinsic staining of teeth is a two stage process. First there is an adsorption of salivary protein to form a pellicle on the tooth surface. Thereafter the chromogen material adheres to the pellicle to cause stain. N1 stain typically comes from foods and drinks such as tea, coffee and wine. The colour of the stain matches the material taken orally. Bacterial adhesion to the pellicle as well as metals such as copper and iron will also induce an N1 stain type.

N2 stains include pigmented materials which bind to the pellicle and then change colour. Examples are seen in the interproximal discolouration at the gingival margin which changes to a brown colour with time. N1 food stains, if not removed, will darken and take on N2 characteristics.

N3 stains are initially colourless but, after chemical transformation, produce chromogens. Stains caused by chlorhexidine or stannous fluoride are in this group.

The common procedure to remove extrinsic stain from tooth surfaces is by abrasives, e.g., prophylactic pastes. However, satisfactory stain removal depends upon the type of discoloration. N1 stains can be prevented or removed by the patient through good oral hygiene. N2 stains are more difficult to remove and need professional cleaning. N3-type stains may need oxygenating agents such as carbamide peroxide to remove them as well as professional cleaning.

Elimination of intrinsic stains also requires the use of chemicals, e.g., hydrogen peroxide, to penetrate enamel and dentin to decolorise or solubilise the chromogens in vital bleaching techniques.

A study in 1994² proposed a broad spectrum approach for removal of both intrinsic and extrinsic stains simultaneously. Removal of extrinsic stain is first aided by use of a surface active agent, e.g., lauryl sulphate. Abrasives like calcium pyrophosphate can disrupt the pellicle plaque matrix, while carbamide peroxide will whiten the teeth by decolorising the extrinsic stains as well as any intrinsic stains. Clinical studies show that this approach is more effective for removing stains and whitening teeth than either a simple dentifrice or carbamide peroxide gel in carrier trays.

REFERENCES:

1. Nathoo, S.A. The chemistry and mechanisms of extrinsic and intrinsic discoloration. Special Supplement *JADA* 128:6s-10s, 1997
2. Nathoo, S.A. and Gaffar, A. Studies on dental stains induced by antibacterial agents and rational approaches for bleaching dental stains. *Adv Dent Res* 9:462-70, 1994.

THIS MONTH'S FIVE NEW QUESTIONS

QUESTION 16

You have decided to place a bonded amalgam in a badly broken down molar tooth.

Which of the following are required for a satisfactory restoration?

1. Resistance form
2. Pin retention
3. Mechanical retention
4. Cusp protection
5. Enamel and dentin conditioning.

- A. 1, 2, 3 and 5
C. 1, 3, 4 and 5

- B. 1, 2, 4 and 5
D. All of the above

QUESTION 17

In children, gingival recession on the labial aspects of permanent mandibular incisors

1. is found in 8-10 % of children.
2. should be corrected as soon as possible by gingival grafts.
3. requires correction by lateral flap surgery.
4. is self correcting.

- A. 1 and 2 B. 1 and 3 C. 1 and 4 D. 4 only

QUESTION 18

Tinnitus is a ringing sound perceived as coming from the ear.

Tinnitus can be associated with temporomandibular disorder (TMD).

- A. The first statement is true, the second is false
B. The second statement is true, the first is false
C. Both statements are true
D. Both statements are false

QUESTION 19

Which of the following are predisposing factors to oral candidal infection?

1. Age
2. Immune deficiency
3. Wearing of dentures
4. Long term antibiotic therapy
5. Uncontrolled diabetes mellitus

- A. 1, 2, 4 and 5 B. 2, 3, 4 and 5
C. 2, 4 and 5 D. All of the above

QUESTION 20

Periodontal disease can place a patient at higher risk for coronary heart disease (CHD).

The risk of coronary heart disease (CHD) is greater in men under 50 years of age with periodontal disease and few remaining teeth.

- A. The first statement is true, the second is false.
B. The second statement is true, the first is false.
C. Both statements are true.
D. Both statements are false.

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CLINICAL PRACTICE



Predictably Restoring Endodontically Treated Teeth

Alex McLean, DMD, B.Sc. (Eng.)

ABSTRACT

Endodontically treated teeth can be restored with a wide range of techniques of varying complexity. This paper presents a straightforward technique for the restoration of endodontically treated teeth that meet certain standards. Criteria are provided for the utilization of crowns, composite resins, cast gold post cores, amalgam or composite build-ups, and passive, parallel, small diameter stainless steel posts to restore these teeth. Consideration is given to ferrule design and its importance in achieving success.

MeSH Key Words: dental restoration, permanent/methods; patient care planning; post and core technique; tooth, non-vital/therapy

© J Can Dent Assoc 1998; 64:782-7

This article has been peer reviewed.

A preceding paper¹ provided criteria to help identify a predictably restorable endodontically treated tooth. The criteria for an endodontically treated tooth requiring a post is that the minimum length of remaining solid tooth equal the sum of the biologic width (2.5 mm), the ferrule length (2 mm), the apical seal (4 mm) and the post length, or 8.5 mm + post length (Fig. 1). For teeth not requiring a post, the requirements are for biologic width + ferrule length, or 4.5 mm of supra-bony solid tooth. Solid tooth refers to dentin that is a minimum of 1 mm thick after preparation. In addition, consideration of the functional loads on a tooth is essential. Single abutments supporting precision attachment removable partial dentures (RPDs), distal extension RPDs or cantilever fixed partial dentures (FPDs) that are endodontically treated or likely to become so in the future should be avoided. Careful assessment of

the occlusal demands and other loads such as FPDs or RPDs must be made prior to restoration.

Choices in Build-up Materials

Any endodontically treated tooth will require a build-up, which may be as simple as closing the access and pulp chamber on an intact anterior. The optimal build-up material will have adequate strength, be biocompatible, exhibit a high level of resistance to bacterial leakage, and be insoluble and dimensionally stable in the presence of oral fluids. Bullard and others² showed that a coefficient of thermal expansion close to that of the tooth reduces leakage, which is important. This paper considers the four materials commonly utilized today for build-ups: cast gold, amalgam, composite, and glass ionomer.

Cast Gold

Cast gold offers strength. Its resistance to leakage is derived

from the luting agent. It doesn't absorb water and has a coefficient of thermal expansion (CTE) very close to that of dentin. Typical CTE for gold³ is 14×10^{-6} ; the CTE of dentin⁴ is 10.6×10^{-6} . Cast gold build-ups require a post for retention and a substantial degree of coronal destruction to be used. Where applicable, this is the build-up material of choice.

Amalgam

Amalgam offers strength. Its coefficient of thermal expansion is almost double that of dentin (about 22×10^{-6} , versus 10.6×10^{-6}), and it is relatively stable in the presence of water. It offers a high-level resistance to leakage once it has been in place for a period of time due to the sealing effects of its corrosion products. Initial leakage has been shown to be significantly lower with dispersed phase alloys than with spherical⁵ alloys. Bonding of amalgams is an option, and has the potential to strengthen

Table 1

	Tensile Strength MPa	Young's Modulus GPa	Coefficient of Thermal Expansion $\times 10^{-6} \text{ }^{\circ}\text{C}$
Cast Gold Type IV ³	701 to 786	69 to 110	14
Amalgam	65.7 ¹⁷	38 to 60 ¹⁸	22 ²
Composite Biscore ¹² /Ticore ¹¹	55/35	13/18.5	25/35
Glass Ionomer	12.4 ¹⁹	9.4 ¹⁹	14 ²
Dentin	59.6 ²⁰	10.2 ²¹	10.6 ⁴

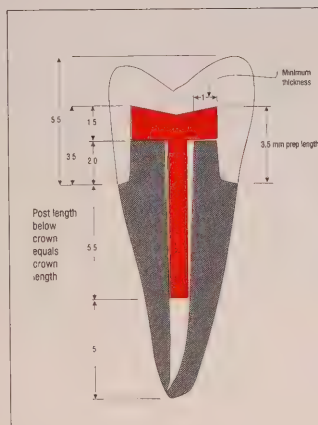


Fig. 1: Minimum dimensions for a predictably restorable tooth.

the tooth and reduce leakage. Christensen⁶ recommends that bonding of amalgam restorations be routine; however, with root-treated teeth, sensitivity is not an issue and the additional strength obtained is apparently transient. Santos and Meiers⁷ found no significant strengthening of teeth with amalgam bond after thermocycling, and Bonilla and White⁸ found short-term increases in strength that disappeared after 500-day storage or load cycling. As apparently the bond of amalgam to dentin will ultimately degrade, there is concern about increased leakage after bond failure. The bonded surface of the amalgam may be more corrosion resistant than an unbonded amalgam, leading to the risk of increased leakage on a long-term basis.⁹ Given the short-term nature of the bond, the additional

time and cost to bond, and unanswered questions as to the effects on long-term leakage, amalgam bonding is contraindicated for build-ups. On posterior teeth with enough pulp chamber depth to obviate the need for a post (2 to 4 mm), amalgam is the material of choice. Where a post is required to retain the build-up, amalgam is cheaper and faster than a cast gold core and often less destructive of tooth structure.

Composite

Composite apparently offers adequate strength clinically, its ultimate strength being somewhat lower than that of amalgam. Its resistance to leakage is almost totally dependent on the luting agent, and the ability of dentin bonding agents to prevent leakage over the long term is unproven. Burrow and others¹⁰ showed a degradation of dentin bond strength in vitro over three years almost to the level of an unbonded restoration. If this is typical clinically, then the long-term ability of dentin adhesives to reduce leakage cannot be relied on, which means composite build-ups must rely on mechanical retention as do amalgam build-ups. The coefficient of thermal expansion for most modern self-polymerising composite build-up materials is significantly higher than that of tooth; examples include Ticore¹¹ by EDS at 34×10^{-6} , and BisCore¹² by Bisco at 25×10^{-6} . In addition, composites show significant setting shrinkage. Sakaguchi and others¹³ showed 0.2% post gel contraction. This

shrinkage results in stresses on the bonding systems that may contribute to long-term bond failure. On anterior teeth where a crown is not required and enamel margins offer the promise of long-term resistance to leakage, composite is an excellent choice. With the poor long-term prognosis for dentin bonding agents and the corresponding risk of leakage, relying on composite build-up materials for leakage control seems risky and unpredictable. On posterior teeth where composite is used as a build-up material, maintaining at least 2 mm between crown margins and the build-up should reduce leakage. The absorption of water with composites is a potential concern due to the generation of internal stresses, but it is difficult to assess the clinical significance of this concern. In addition, it has been shown that the mechanical properties of composites degrade with thermocycling and exposure to water.¹⁴ Kovarik and others¹⁵ showed significantly shorter fatigue life for composite build-up supported crowns than for those with amalgam build-ups. While composites are fast and convenient to use, in most instances they are inferior to amalgam and gold.

Glass Ionomer

Glass ionomer filling materials offer a low level of leakage,^{16,2} a relatively weak dentin bond and a low level of mechanical strength (Table 1). They offer the appeal of fluoride release to reduce decay potential, but there is minimal evidence that this has any clinical significance. Kovarik and others¹⁵ fatigue-tested crowns with amalgam, composite and glass ionomer cores, and found that amalgam was significantly stronger than composite and that glass ionomer had inadequate strength as a core build-up. Because of its weak mechanical properties, glass ionomer has little to offer as a build-up material and should be reserved for limited applications such as blocking out minor undercuts.

Ranking of Build-up Materials

When a post is required and there is sufficient coronal destruction to allow cast gold without sig-

nificant additional loss of tooth structure, cast gold is best. In situations where a build-up can be retained without a post, or where a post is needed but the placement of a cast gold core build-up would require significant removal of additional tooth structure, amalgam would be the material of choice. In teeth where simple closure of the access preparation is all that is required and enamel margins offer the potential for long-term resistance to leakage, composite resin is the material of choice. Glass ionomer is not suitable for build-ups.

How to Retain the Build-up

With the use of cast gold, a post is mandatory for retention. With amalgam or composite, the retentive options are pins, posts and mechanical undercuts such as offered by a pulp chamber. The use of pins to retain build-ups carries the risk of microfracture and introduces stress into the adjacent dentin. Teeth that require pins or posts to retain build-ups have already suffered significant coronal destruction. Caputo²¹ recommends a minimum of 1 mm of solid dentin to surround a pin, yet this thickness is rarely available to retain build-ups on root-treated teeth. The undercuts in pulp chambers can be used to retain build-ups; Nayyar and others²² and Kane and others²³ have shown that pulp chamber depths of 2 to 4 mm offer adequate retention for an amalgam build-up without pins or posts. The use of slots or dovetails cut into dentin to retain the amalgam has appeal but requires the destruction of more tooth structure. There is also a risk that these retentive devices will be removed or weakened during crown preparation.

Posts offer the ability to retain the build-up and, if carefully placed, remove little tooth structure. They are also removable for orthograde endodontic retreatment.

The Choice of Final Restoration

Crowns placed on anterior teeth do not make teeth inherently stronger.^{24,25} In the absence of significant coronal destruction, a

tooth is better restored simply by closing the access with a composite resin. Once distal to the cuspid, placement of a cast restoration that shoes the cusps improves the odds of success.²⁴ Placement of a crown on an anterior tooth is indicated when there is extensive coronal destruction or the need for occlusal change, or for esthetic reasons. In such situations, the mechanical and esthetic properties of porcelain, porcelain on gold, or modified resin crowns such as Vectris-reinforced Targis crowns offer advantages over large composites.

Considerable focus has been placed on the potential for coronal leakage to cause the failure of otherwise acceptable endodontic treatment. Torabinejad and others,²⁶ Swanson and Madison,^{27,28} and Khayat and others²⁹ showed that leakage will occur coronally along the obturated canal if the coronal access is not effectively sealed. In a retrospective study, Ray and Trope³⁰ have shown that the long-term success of a restoration depends more on the quality of the final restoration than on the quality of the endodontics. The importance of the quality of the final restoration and its ability to minimize leakage cannot be overstated.

Ferrule Design

The importance of ferrule, its design and execution cannot be ignored. A recent *in vitro* study by Freeman and others³¹ compared leakage under post-retained composite cores and cast gold post cores and the number of cycles until a strain gage detected movement between the artificial crown and the root. Movement between crown and root was measured very early in the experiment, on average after only a few hundred cycles. In the experimental design, tooth preparation "extended 1 mm apical to the core-tooth interface, thereby providing a 1 mm ferrule on tooth structure."³¹ In reality, when the teeth were sectioned and the margins examined, there was little or no ferrule present. The cross-sections effectively showed a chamfered or bevelled margin that was far from parallel. Both Barkhordar³²

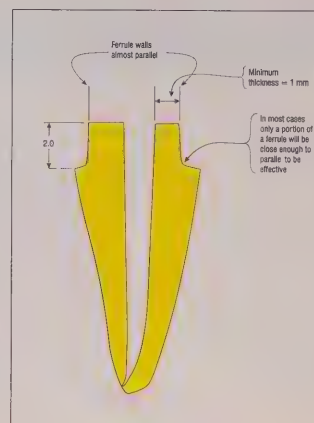


Fig. 2: Ferrule criteria and dimensions.

and Sorensen³³ have shown the importance of at least 1 mm of almost parallel wall preparation. The study by Freeman and others highlights the misconceptions as to what constitutes a ferrule. Given the realities of intraoral tooth preparation, a minimum of 2 mm of preparation length on solid tooth is recommended to ensure an adequate length of parallel wall to achieve an effective ferrule (Fig. 2).

When to Place a Post

Posts have one purpose, to retain a build-up on a tooth. There is compelling evidence that they do not strengthen teeth.³⁴⁻³⁶ The use of certain post designs can predispose them to catastrophic failure, as shown by Sorensen and Engelman.³³ Based on this premise, posts function primarily in tension. A relatively small diameter post has ample strength in tension to retain any crown. The rather loose adaptation of a small diameter post in a canal does not reduce retention, as shown by Chan and others.³⁷ Standlee and others³⁸ showed that post diameter was not a major factor in retention and the parallel-sided para post was more retentive than a smooth-tapered dowel design. In situations where an artificial crown breaks off and either shears off the post or dislodges it, there is at least the potential for retreatment. Utilization of larger posts requires the removal of additional tooth structure and weakens the tooth,³⁹⁻⁴¹ increasing the risk of

catastrophic failure and of having a tooth that is unrestorable.

Passive Metal Posts

Passive metal posts include parallel, tapered, and custom posts. Weine⁴² showed a 94% success rate with smooth-tapered posts over 10 years. In a study of 1,273 teeth restored a minimum of one year, Sorensen and Martinoff⁴³ showed a 97% success rate for any post crown restoration in which the post length equalled or exceeded the crown length. Torbjorner and others⁴⁴ reviewed almost 800 posts after four years, and parallel posts showed half the failure rate of custom-cast tapered posts. Post length is key and ideally should extend into the root past the crown margin by an amount equal to the length of the crown. Conservation of dentin is critical in post placement and dictates a post diameter that requires minimal canal instrumentation. Parallel post designs offer increased retention over tapered designs.^{37,38}

Active Posts

Active post designs rely on some form of mechanical engagement of cutting flutes into dentin to gain increased retention. One active post design, the Flexi-Post by EDS, purports to provide the retention of an active post while avoiding the potential stress on the root of a conventional solid active post design. As pointed out by Manning and others,⁴⁵ for the Flexi-Post design, the change in diameter provided by the slot in the post is minimal. The post compresses to an ellipse whose greatest width is almost equal to the original diameter. Standlee and Caputo⁴⁶ showed Flexi-Posts generated significant stress levels comparable with other active post designs. While the additional retention of an active post has appeal, any active post design induces more stress into a root than a passive design.

Carbon Fibre Posts

There has been a lot of interest in carbon fibre post systems, specifically the composipost. These claims include ease of

removal for retreatment (apparently valid), a modulus of elasticity (Young's) close to natural tooth, which decreases the risk of stress concentrations, and a high level of retention because the post bonds to the resin system used to retain it in the root. Sidoli and others²⁵ showed *in vivo* crowns retained with composiposts failed under 63% of the load required to break para-post retained crowns. Purton and Love⁴⁷ showed bonded para-posts to have 168% of the retention of carbon fibre posts. The suggestion that a Young's modulus close to tooth is an advantage is questionable when the coronal restoration will be a rigid cast metal or ceramic crown. The increased flexibility in the coronal and radicular tooth structure resulting from these posts should cause increased, not decreased, stress concentrations at the crown margins. Despite the preceding, Fredriksson⁴⁸ and others showed an almost 100% success rate in a retrospective study of 236 teeth restored with carbon fibre posts for over two years. Carbon fibre posts may offer promise, but with conflicting evidence and limited clinical trials, they cannot be recommended for routine use. The clinical evidence is clear in both *in vivo* and *in vitro* studies that adequately designed passive posts deliver highly predictable results. Passive, small diameter, parallel post designs are predictable and simple to use and are the design of choice.

Cast or Preformed Post

With a passive round post design as a starting point, the question is whether to use a cast post core or a preformed post-retained amalgam or composite build-up.

A cast post design is indicated where alignment of the proposed crown is significantly different from the inclination of the canal, which is often the case with anterior teeth. With most anterior, and some bicuspid teeth, there is also inadequate room for sufficient bulk of build-up material around the post to provide a solid unit. Thus for most anterior teeth and

small bicuspid teeth requiring a post, the choice is a cast post core design. When used, a cast post core should utilize a high-strength type IV gold alloy or a similar high-strength non-precious alloy. Preformed posts with a direct build-up work very well in posterior teeth where there is room for sufficient bulk of build-up material. Canal angulation is infrequently a problem. Preformed posts with an amalgam build-up are often more conservative of tooth structure than cast gold in posterior teeth. They are generally less expensive and quicker to fabricate.

With preformed posts, stainless steel (SS) posts are stronger for any given size than titanium posts and they are more radiopaque. This radiopacity is an advantage, making a post easier to identify clinically. The Parapost system by Whaledent is currently the only passive, parallel, SS preformed post series on the market available in small diameters. The system provides 0.9, 1, 1.14 and 1.25 mm diameter posts in addition to larger diameters.

Post Head Design

Where a preformed post is used to retain a composite or amalgam build-up, the ability of the build-up material to attach itself to the post is important. Chang and Millstein⁴⁹ tested the retention of Paraposts and Unity posts by Whaledent, and the Flexi-post by EDS with two types of composite build-up as well as amalgam. They found that the amalgam core was significantly more retentive than either composite core. Their results show the importance of the retentive features built into a post head. When trimming preformed posts, it is essential that this feature be retained. Use of preformed posts without such features should be avoided.

Post Cements

From the perspective of the ability to retrieve the post in the case of fracture or for orthograde endodontic retreatment, the use of a resin cement is contraindicated. In addition, the ability of resin cements to provide long-term resistance to coronal leakage is dependent not

only on the longevity of the dentin bond but also on the bond to the post. Both are unproven. There is little or no evidence that the increased retention offered by these cements is a factor in clinical success where adequate post length can be obtained. In fact, Standlee and Caputo⁵⁰ warn that too much retention may predispose a tooth to fracture. ZnPO₄, and resin modified glass ionomer cements such as vitremer luting, offer adequate retention and resistance to leakage and simplify post removal. Pure glass ionomer cements should work as well but are sensitive to moisture or the lack of it in a canal when setting. The use of resin cements should be reserved for cases outside of these criteria where adequate post length and retention are not available.

Post Hole Preparation

It is possible to disturb the apical seal during post-hole preparation. A 4 to 5 mm apical seal of gutta-percha is recommended based on research by several authors.⁵¹⁻⁵³ Mattison,⁵¹ Camp,⁵² Suchina and Ludington,⁵⁴ and Haddix and others⁵⁵ reviewed a range of techniques for post hole preparation and the removal of gutta-percha. Mattison and others, Camp and Todd, and Suchina and Ludington found little difference between mechanical removal with Gates-Glidden burs and removal with a hot plugger, while Haddix and others found that removal with a warm plugger produced the least leakage. Gates-Glidden burs offer a simple and predictable method for the removal of gutta-percha.

Discussion

The restoration of anterior teeth needs better criteria on which to base restorative decisions. Even knowing when to place a crown on an anterior tooth is very hard to determine. The issue of leakage with endodontically treated teeth is of concern: how much leakage is too much? Does the degradation of dentin bonding agents over time present a concern for clinically significant leakage under build-ups or along posts? This paper does not provide guidelines for the restora-

tion of compromised endodontically treated teeth nor indicate how to restore structural integrity to existing crowns that have had an endodontic access placed through them. Both areas need research and guidelines to aid the clinician in restoring these teeth.

Summary

When restoring an endodontically treated tooth, the first step is to assess the level of predictability involved in the restoration. If the tooth meets the previously outlined criteria, then the following approach is recommended.

On anterior teeth with intact crowns, simply closing the access with composite is as successful as placing a crown. Where significant coronal destruction has occurred, use a crown with a cast post core.

A crown is indicated on all endodontically treated posterior teeth. In preparing the tooth, parallel ferrule walls are essential and should be a minimum of 2 mm long apico-coronally. In addition, the thickness of the remaining dentin should be no less than 1 mm on the buccal and lingual wall areas, and optimally interproximally as well.

For the build-up use amalgam, and where inadequate pulp chamber depth remains to retain the build-up, a preformed post should be placed. On some posterior teeth such as small upper first bicusps, cast gold post cores will be preferable to amalgam where tooth size prevents adequate bulk of build-up around the post.

Where a post is needed, use a small diameter, passive round post requiring a minimum of dentin removal and use a post length that extends into the root past the crown margin by the length of the crown. Cement the post with ZnPO₄ or a hybrid resin/glass ionomer cement, leaving an apical seal of 4 mm of gutta-percha. ■

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The author has no declared financial interest in any company manufacturing the types of products mentioned in this article.

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Dental Cements: A Further Update

Derek W. Jones, PhD, FIM, C.Chem., FRSC(UK), FBSE

PRACTITIONER'S QUESTION

Further to the article on cements that appeared in the September edition of the *Journal* (64:569-70), I have some additional questions. 1) I recently came across the term phenolate cement. Is this a new type of dental cement? 2) Why are zinc oxide-eugenol cements recommended for temporary restorations? 3) I am very confused about the difference between the so-called traditional glass ionomer cements and the newer hybrid or resin ionomer cements and their potential use. 4) Which of the cement materials have the best resistance to solubility in the mouth?

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Dr. Jones's Answer:

The Phenolate Cement

Zinc oxide-eugenol cements have always been regarded as the blandest in terms of their effect on the dental pulp. For this reason, these materials were commonly used as the control in biocompatibility pulp research studies on cements and restorative materials. Zinc oxide-eugenol cements have traditionally been used as temporary restoratives because of the sedative effect on the pulp, which may be enhanced by the excellent seal they produce. As a young child, I always associated the characteristic lingering smell of the eugenol (oil of cloves) with a visit to the dentist. Replacing part of the eugenol liquid with ethoxy benzoic acid can produce cements that have greater strength. Zinc oxide-eugenol cements are in fact classified as "phenolate" cements based on the chemistry of the mixing liquid and the matrix of

the set cement. Phenolate cements have been around for a long time.

Selection of Cements

Particular clinical applications require some knowledge of the chemistry and physical properties of the different cement types. It should be noted that not all cements may be suitable for their specific intended application due to incompatibility with adjacent materials or the particular clinical requirements involved. Zinc polycarboxylate cements were the first to be developed (by Dr. Dennis Smith) that had the capacity to chemically bond to natural tooth. Aquacem, Durelon and Tylok Plus are zinc polycarboxylate cements.

Hybrid or Resin Ionomer Cements

Conventional glass ionomer cements can be supplied as an ion leachable glass powder to be mixed with an aqueous mixture of polyacrylic acid or as a blend of freeze-dried polyacrylic acid and an ion leachable glass powder for mixing with distilled water. The manufac-

turer can also add a small amount of tartaric acid to the water that will provide a sharper, better defined setting reaction. Early release of calcium ions is responsible for the setting reaction of glass ionomer cements. The slower release of the aluminium ions is responsible for increased cross-linking, which significantly improves the strength over a period of several days. This clinical factor is important when using glass ionomer cements. Examples of traditional glass ionomer cements include Ketac-Cem, Fuji I, and Shofu I.

The so-called hybrid ionomer cements (Advance, Fuji Plus and Vitremer Luting) combine an acid-base reaction of the traditional glass ionomer with a self-cure amine-peroxide polymerization reaction.

In recent years, the so-called light-curing resin-modified glass ionomer (dual cure) systems have been developed by adding some polymerizable functional methacrylate groups with a photoinitiator to the formulation. Such

materials undergo both an acid-base ionomer reaction as well as curing by photo-initiation of methacrylate carbon double bonds. Some systems have also incorporated a chemical curing tertiary amine-peroxide reaction to polymerize the methacrylate double bonds along with the photo-initiation and acid-base ionic reaction. These materials are known as tri-cure glass ionomer cements. The chemical cure component of tri-cure cements has been shown to have a significant effect on their overall strength. Photo-initiated cements cannot be used in cases involving opaque structures such as metal substrates. The resin-modified glass ionomer cements generally have a much lower release of fluoride than the conventional glass ionomer materials.

Expanding Cements

After the setting, expansion due to water uptake has been observed for some of the newer resin-modified glass ionomer cements (Fuji Duet, Vitremer and Advance) compared to a regular resin (BIS-GMA or urethane acrylate) cement such as Panavia 21, which is a self-cure resin cement. Conventional glass ionomer luting cements, the old standby zinc phosphate cement and resin cements all undergo contraction during setting. The BIS-GMA or urethane acrylate resin cements all undergo polymerization shrinkage during setting. However, the presence of glass filler in some resin cement materials reduces the shrinkage and can impart radiopacity. Many of the resin cements are now supplied in the form of dual cure systems (photo-initiated as well as tertiary amine-peroxide reaction). Such materials include Adherence, Choice, Duolink, Enforce, Lute-it, Nexus, Opal, Resinomer, Scotchbond Resin Cement and Variolink.

Marginal Gap

It is important to note that the main function of a luting cement is to provide a non-permeable seal at the margins around the restoration. The marginal cement-filled gaps around inlays, crowns and bridge abutments can range from 25 to 150 μm . Research has

shown that the wider the cement gap at the margin, the greater the cement loss (ditching). A rough cement surface is an ideal site for plaque accumulation. In such a situation, slow release of fluoride can be a very distinct advantage.

Erosion and Solubility

In general, glass ionomer cements tend to have the least erosion, and polycarboxylate cements the most. However, solubility, erosion and strength are significantly affected by the powder/liquid ratio used. Cement erosion and solubility during static immersion in distilled water have been found to give very different results to a jet erosion test using lactic acid. Polycarboxylate cement is the most soluble by a jet erosion test and is much less soluble during immersion in distilled water. In contrast, resin-modified glass ionomer cements can be soluble, releasing constituents during immersion in distilled water, but prove to be the least soluble using a jet erosion test. In contrast, the resin cements are basically insoluble, but may release small amounts of unpolymerized monomer constituents.

Conclusion

It is very important for all dentists to recognize that conventional dental cements are in fact generally manufactured at the chair side in the dental office. The dentist or chair-side assistant mixes a powder and liquid, which results in an acid-base chemical reaction. Manipulation of the cement is very important; variations in the powder/liquid ratio can influence the working and setting time, the consistency and flow, as well as the degree of solubility, erosion, strength and film thickness. However, as stated in the previous article on cements, several cements are now being supplied in capsules containing the pre-portioned powder and liquid.

We should never select any material on the basis of one property alone. In the case of cements, we have to consider the following: solubility, erosion, tensile strength, shear strength, toughness, elastic modulus, creep, working and setting time, sensitivity to

moisture during and after setting, thermal conductivity and diffusivity, pH during setting, biocompatibility, compatibility with other restorative materials, potential for fluoride release, adhesion to enamel and dentine, sensitivity of setting reaction to temperature, rate of change in viscosity, film thickness, and dimensional change in the presence of moisture. Thus the selection of a cement, like all other dental materials, must always be a compromise. ■

Dr. Jones is professor of biomaterials at Dalhousie University, Halifax, Nova Scotia.

The author has no declared financial interest in any company manufacturing the types of products mentioned in this article.

Editor's note: I invite readers to send me questions about clinical problems experienced in everyday practice. I will seek answers to these questions from recognized Canadian experts. You can send me your questions by e-mail, fax or regular mail. I look forward to hearing from you.

Schizophrenia

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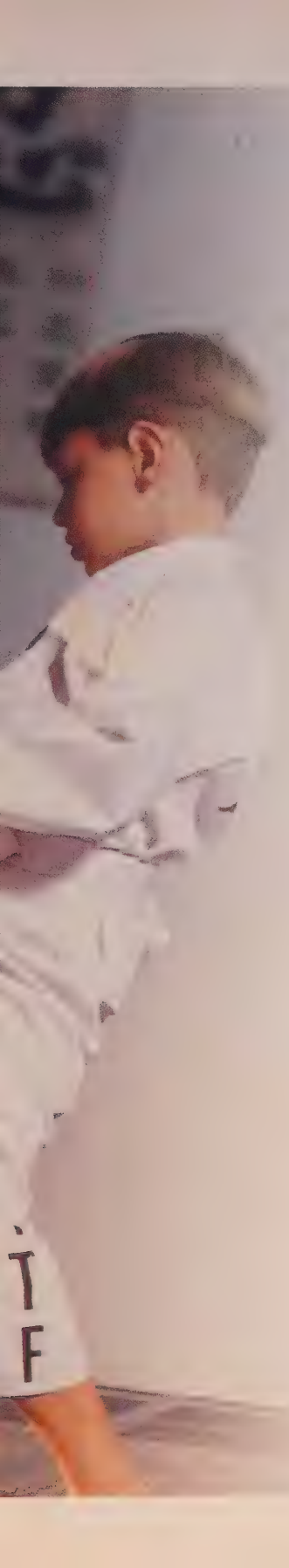
Journal

December
1998
Vol. 64
No. 11

A man in a white martial arts gi is performing a high kick on a large, round, red and black target. The target has a white starburst design on the red side. The man is smiling and looking towards the camera. The background is a plain, light-colored wall.

He's also a dentist.

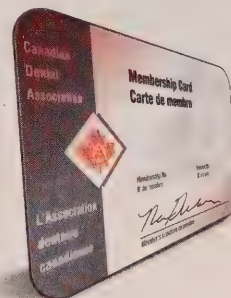
John Fitzgerald, Dentist, CDA member and devoted dad.



John Fitzgerald loves practising Taekwon-Do with his son, Jacob. It gives them a chance to spend some quality time together, while learning about self-defense, confidence, and integrity. They get a big kick out of it, and practise as often as three times a week. That's a lot considering John's a successful dentist. But, because he's a CDA member, John can enjoy Taekwon-Do as much as his career.

CDA delivers services that support dentists in the daily operation of their practices. CDA's electronic claims management system, CDAnet, links the dental office to the insurance company – thereby speeding up the insurance claim process. CDA's practice management publications provide a reference for dentists facing financial, human resources, or office administration decisions. Through public education programs, which include advertisements and information hand-outs, CDA helps inform patients on the importance of proper oral health and maintenance. In short, CDA is your best resource for practice management information.

John's glad he's a CDA member. It allows him to focus on the important things in his life other than his career; like blocking Jacob's well-aimed kick to the midsection.



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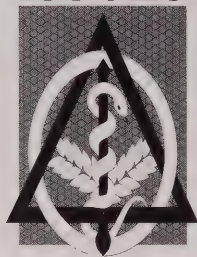
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PROFESSIONAL ISSUES



Managing Dental Care Versus Managed Dental Care: Looking South from North of the 49th Parallel

James L. Leake, DDS, DDPH, MSc, FRCD(C)

ABSTRACT

In the United States, aggregate expenditures on the largely private health care system, as a proportion of Gross National Product, exceed those of all other countries. Under private enterprise, the health care system in the United States grew as predicted by the underlying equation that more service volume equates to more revenue for hospitals and providers. Managed care is the response of for-profit health care organizations to meet the demands of U.S. corporations to contain the escalating costs of hospital, medical and other health care benefits for their employees. Managed health care has several models, but preferred provider organizations (PPOs) have been the model that has increased most rapidly.

In contrast, managers of Canadian public dental programs plan, organize, direct and control more of the structures, processes and outputs to achieve desired outcomes for special groups. In Canada, the approaches to quality assurance, restraint of trade and the power of the professional lobby are different from the approaches in the United States. Nonetheless, the context of private dental care plans is very similar to the context that produced managed health care in the United States. Better management to meet demonstrated needs with evidence-based care can result in sustainable, adequately financed plans and avoid the deep-discount form of managed dental care.

MeSH Key Words: dental care/economics; health care costs; insurance, dental; managed care programs/trends.

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Introduction

In Canada, public dental programs have been developed to address the unmet needs of schoolchildren, people receiving public assistance, aboriginal people, members of the Canadian Armed Forces and seniors.¹ In the United States, managed care is a response to employers' concerns over quality of care and the rapidly increasing costs of private health insurance plans (medical, dental and hospital). Thus, the prime goal of managed care in the U.S. has been the containment of health care costs rather than the

achievement of coverage, service or health goals for its citizens.

Purpose

This paper reviews management as it applies to dental programs, describes managed dental care models and compares the intensity of management with that in Canadian public dental programs. The similarities in the context from which managed care evolved in the U.S. and the differences between Canada and the U.S. in assuring quality and restraint of trade are described. I suggest that better management could help sustain dental plans.

Definitions

Management

Management consists of the activities of assessing, planning, organizing, directing, controlling and then re-assessing (Fig. 1). In most social or business organizations, managers assess the context in which the plan is to function. They also monitor and control many of the structures and all of the processes in an attempt to achieve the desired outputs and outcomes.

Managed health care

Managed health care has been defined by the Physicians Payment

Review Commission in the U.S. as: "Any system of health service payment or delivery arrangement where the health plan attempts to control or co-ordinate use of health services by its enrolled members in order to contain expenditures, improve quality or both. Arrangements often involve a defined delivery system of providers with some form of contractual arrangement with the plan."

Managed care organizations (MCOs) combine the traditional role of the insurance company with that of the manager of health care delivery. Commonly, MCOs integrate health care delivery and financing by selecting providers and arranging with them to supply health services, by using financial incentives to direct patients to the providers in the managed care plan and by operating information systems to monitor the amount of care and the quality of the services.² From the patients' perspective, common features of managed care are access to a restricted list of providers (e.g., those dentists participating) and significant financial barriers to obtaining care outside the managed care plan.

Dental insurance

Dental insurance is not true insurance, because individuals have usually experienced some of the loss (disease), much of the future loss is relatively predictable and controllable, and it is rare for the future loss to be catastrophic. Dentists of patients who have switched coverage to a managed plan are usually dealing with new disease, trauma or repairs to existing restorations. If the care needed by an individual were more extensive, then the dentist and patient, for health or other reasons, might decide to spread the care over some months and coincidentally match the expense of the care with the monthly revenue. Thus, for dental insurance, the risk of unexpectedly high payouts is controllable.

To understand the nuances between the different schemes it is important to recognize that dental practices (even solo practitioners) are small firms and that the firm and the dentist can be paid differ-

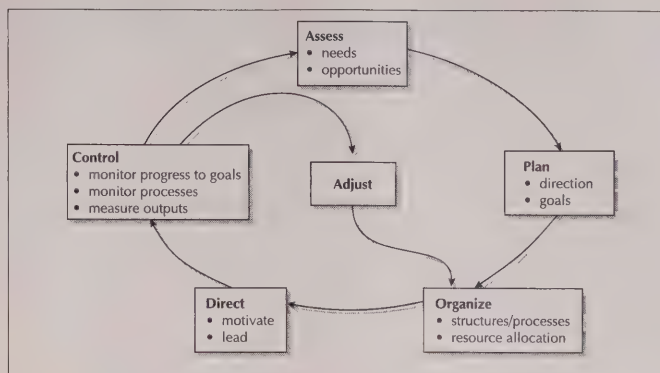


Fig. 1: Management function

ently.³ Thus, the dental firm can receive revenue on a yearly contract, as fee-for-service or by the person enrolled (capitation) and in turn pay its employees, including the dentist, an annual salary, a sessional rate, fee-for-service or a percentage of the earnings.

Examples of Managed Care

The first requirement for managed care is a contract that specifies the types of dental care to be provided to or paid for a defined group of eligible people for a specific period of time. The contract is drawn between an employer and an MCO, whereby the employer agrees to pay most or all of the premiums on behalf of its employees and the MCO agrees to use the funds to pay for the care of the employer's staff and dependents. Beyond these fundamentals, the term "managed care" applies to several models of care delivery. This ambiguity can be confusing, because the models vary greatly, especially in the dispersion of the funds.

Managed dental care models are described below,⁴ but most are found only in the U.S. Where there is an example of an equivalent Canadian program, it is cited for the reader's reference. In addition, two Canadian examples of publicly administered dental care programs are cited to demonstrate the wider extent of dental care management in Canada.

Prepaid health maintenance organization (HMO) — staff model

The HMO effectively owns the building and equipment and

employs all staff, including dentists, paying them by salary or sessional basis as independent contractors. The HMO bears all the risk. Publicly administered Canadian equivalents include dental services provided by the Canadian Armed Forces, municipal health unit programs and the clinic operated by Akwesasne First Nation.⁵

Prepaid HMO — group model

The HMO subcontracts with a dental group (firm) to provide the care. The dental group owns the building and equipment; the subcontract pays for care on a capitated basis, but the group can pay its staff and providers by capitation, salaries or fee-for-service. The dental group assumes the risk.

Prepaid HMO — network model

The HMO subcontracts as above, but with more than one dental firm.

Independent practice association (IPA)

The MCO subcontracts the care to independent practitioners or firms at capitated (for most plans) or fee-for-service (for a minority of plans) rates. Dentists own and operate their own practices and may have no patients or any number of patients from the insured group appear in their offices. The dental firms assume the risk.

Preferred provider organization (PPO)

The MCO subcontracts the care to independent practitioners or firms at deeply discounted fee-for-service rates. The dentists operate their own practices and may have no patients or any num-

Table 1
Extent of management by type of dental care program

Management Functions	Managed Indemnity	PPO	IPA	CINOT	Staff HMO	MSB Therapist
Assess						
group needs				XX		XX
health promotion opportunities				XX	XX	XX
Organize Inputs/Processes						
legislation				X		XX
provider numbers		XX	XX		XX	XX
provider distribution		X	X	X	X	XX
provider types					XX	XX
payment method			XX		XX	XX
gatekeeping			XX	XX	XX	XX
equipment					XX	XX
defined services	XX	XX	XX	XX	XX	XX
co-payments, limits	XX	XX	XX		X	
clinical protocols				X	XX	XX
dollar flow	XX	XX	XX	XX	XX	XX
risk to providers			XX			
Manage Process of Care						
monitor processes	X	XX	XX	XX	XX	XX
adjust processes					XX	XX
Measure Outputs	X			XX		XX

ber of patients from the contracted group appear in their offices. The MCO assumes the risk.

A close Canadian equivalent is the dental welfare program operated for 30 years by the Ontario Dental Association (ODA). The ODA holds a contract with the Ministry of Community and Social Services to have dentists provide care for reduced fees.

Managed indemnity plan

The contract with the MCO allows patients to choose their provider, who is paid by fee-for-service. The MCO exercises some degree of utilization control (deductibles, co-insurance, co-payments, prior review) to attempt to contain costs. The MCO bears the risk. This model corresponds to most current plans in Canada.

Two additional Canadian examples

The **Children in Need of Treatment (CINOT)** program in Ontario provides one course of

comprehensive care to children in urgent need. The plan features screening of all children for the identification and referral of those in need (gatekeeping). It includes prior review of the need for more expensive services and universal post-treatment review of patients to reassess needs and to assess the outputs of care.

The Medical Services Branch (MSB) of Health Canada operates a direct service dental program for aboriginal communities in the territories and most provinces. This **MSB dental therapist model** features an assessment of past care and current needs and the prescription of care by a dentist. Care is provided by dental therapists according to the prescription and to standing orders in field manuals. In addition, the resident, salaried dental therapists are expected to conduct health promotion activities to reduce the need for their services.

If There Is Managed Care, Is There Unmanaged Care?

Rather than a dichotomy of managed and unmanaged care, there is a continuum of management involvement.⁴ **Table 1** demonstrates the extent of management by the common types of plans outlined above. The row titles detail the management functions. The column headings show four common types of insured dental care plans available in the U.S. plus two Canadian examples. The plans are listed from the least to the most intensely managed. An XX indicates that the given management function is usually conducted in that plan or program, and an X indicates that the function is conducted, but less commonly.

Indemnity programs are the least managed. Administrators monitor the profile of services and the cash flow. At the renewal of the contract, they try to balance predicted revenues and expenditures by altering premiums, defined services and co-payments.

Only Green Shield plans in Ontario have implemented methods of checking on completed care.⁶ In the U.S., cost-containment provisions have become much more severe to allow the indemnity plans to compete with the reduced costs achieved by the other forms of managed care.

With PPOs, the managers enrol providers close to where the group members live by offering the participating dentist increased numbers of patients but at reduced fees.

IPAs require more management than PPOs. Many alter the method of payment to capitation and limit direct access to specialist services (gatekeeping). With the capitation method of payment, the provider or firm is at risk for cost overruns.

The Ontario CINOT program is based on population estimates of urgent care needs. In conjunction with the school-based public health promotion programs, CINOT tries to alter population risk behaviours and consequently the needs of the target group. Protocols are in place to establish the urgent and referral criteria as well as the criteria to follow to approve payment for the specialist and additional services.

Staff HMOs appear to be the next most intensely managed, requiring a manager to hire appropriate numbers and types of providers to meet the needs of the group.

The most intensely managed program is that of the MSB, which provides care to members of Canada's aboriginal communities. The supervising dentist is the diagnostician, supervisor and assessor of success of care. The provision of care is delegated to dental therapists. Other jurisdictions have demonstrated that the quality of the services is as high as or higher than the quality provided by dentists.⁷ Additionally, the MSB program is cost-effective, even accounting for the additional expense of quality assurance and the operation of the special training school.⁸

The Rush to Managed Care in the U.S.

The U.S. spends more than any other nation on health care, but follows the developed world in many commonly accepted health indicators.⁹ Until the early 1990s, the U.S. had a health care system dominated by private enterprise, with privately owned facilities financed by publicly subsidized, private insurance. Physicians (and dentists) were seen as independent practitioners and were paid largely by fee-for-service. The public subsidization was through the tax treatment of the insurance premiums, which were tax-deductible, resulting in tax expenditures of \$10 billion in 1978.¹⁰

Real change was demanded by employers, who paid most of the ever-increasing costs. For example, in 1988, Shosenberg,¹¹ editor of *Ontario Dentist*, wrote that the biggest supplier to General Motors was Blue Cross/Blue Shield, that \$2 of every \$57 tire went to health care and that Hewlett Packard's health bill per employee went from \$500 to \$1,500 in 10 years.

In 1978, Alain Enthoven,¹⁰ an economist from Stanford, pointed out that in the U.S. an "unjustified and unnecessary increase in costs [occurred because of] the complex of perverse incentives inherent in the tax supported system of fee-for-service for doctors, [and] cost reimbursement for hospitals." He noted that fee-for-service rewards the doctor for providing more and more costly services, whether or not the services are necessary or beneficial to the patient; that cost reimbursement rewards the hospital with more revenue for generating more costs; and that third-party reimbursement leaves the consumer with, at most, a weak financial incentive to question the need for or value of services or to seek a less costly provider or style of care.

In the meantime, U.S. legislation allowed the development of vertically integrated medical, dental and hospital care delivery models. One such model was that of the health maintenance organization (HMO), a prominent exam-

ple being the Kaiser-Permanente HMO.¹² Managers implemented sophisticated health management information systems, capitation payments to subcontractors (e.g., physicians), salaries for their in-house staff and strict clinical protocols to guide decisions such as hospital admission. Health outcomes equivalent to fee-for-service indemnity plans and savings of 10% to 40% over those plans were achieved with no co-payment or other financial deterrents to the patients.¹³

With the failure in 1994 of the Clinton plan to reform health care in the U.S. through changing public policy, MCOs moved to profit from those potential savings of 10% to 40%. Large, private MCOs bought formerly not-for-profit HMOs, smaller community facilities and privately owned facilities, including hospitals, old age homes and large clinics.¹⁴ Then they restructured staff and facilities to enable them to bid for contracts to provide employer/employee group health plans. Employers willingly switched because of the assurance of quality and lower and more predictable costs. However, in addition to the standard HMO models of care, MCOs introduced and expanded other models such as IPAs, PPOs and points of service (POS).

Why the rush to offer managed care in the U.S.? First, employers began banding together to issue the equivalent of tenders for their health care programs.¹⁴ Second, from the perspective of health care organizations, a potential profit of even 10% in the U.S.'s estimated annual health expenditures of one trillion dollars is worth bidding for. By the fall of 1996, 69% of insured health care in the U.S. was provided under a managed care plan (distributed by type as follows: POSs, 18%; HMOs, 29%; PPOs, 22%).¹⁵ More recent estimates quote 77% of insured health care being provided under managed care plans, with the numbers swelling further through the conversion of publicly funded care for Medicare patients to Medicare HMOs.¹⁶ Most of the increase has occurred in the

deep-discount-fee PPO model.¹⁵ The result is a system that is much more cost accountable, managerial (as opposed to physician-run) and primary-care dominated (as opposed to specialist dominated), with gatekeeping for admission to hospital. It rewards lower costs and quality on a system-wide basis.¹⁵

Potential Demand for Managed Dental Care Plans in Canada

The forces that led to managed health care in the U.S. parallel the circumstances of dental health care plans in Canada today:

- publicly subsidized, indemnity, fee-for-service, private dental plans;
- plans that are increasing in cost by much more than price increases in the economy — 21% over three years (1992 to 1995) when inflation was running at 1.4% annually;¹⁷
- corporations (especially in Ontario) and public-sector employers that are seeking ways to end the exponential cost escalation;¹⁸
- many of the same insurance companies that are participating in managed dental care in the United States.

However, we are different in at least two ways. First, to deal with the perception that the quality of care is diminished in both PPO and capitated plans, the U.S. approach is to provide full information to enable employers to make informed decisions about which plan to choose.^{16,19,20} In contrast, in Ontario at least, current legislation requires the Royal College of Dental Surgeons of Ontario (RCDSO) to develop a quality assurance program that includes standards of practice.²¹ The RCDSO intends to inspect a random selection of dental offices to ensure that the standards are being maintained. Thus, employers and employee groups will have more assurance that standards are equivalent, no matter what the basis for provider reimbursement under the plan.

Second, Canada has less stringent restraint-of-trade practices.

Thus, the dentist lobby in Canada can exert considerable influence on the economic practices of the profession. In the U.S., the Federal Trade Commission would have limited much of the activity that the dentists of Ontario were able to conduct in their "No dentists — no cap" campaign in the early 1980s. Thus, any path to reform dental care plans in Canada will be more influenced by the professional lobby.

Concluding Views

In the past, employers and employees have had little input into dental plans. Insurers and the profession have dictated what employees and their dependents should receive and what employers should pay for. Plans that provide evidence-based care to meet demonstrated needs should continue to be supported with adequate and sustainable financing. Plans that remain volume-based will be subject to the cost-containment agenda, threatening both the sustainability plans and the health outcomes of patients. The experiences in the U.S. indicate that resisting attempts to revise volume-based plans will foster the development of deep-discount, PPO, managed dental care. Real management, including participation in the planning by all stakeholders, could help retain the benefits of plans for patients and dentists. ■

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The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the Canadian Dental Association.

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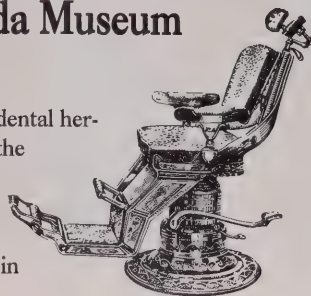
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Journal

December
1998
Vol. 64
No. 11

797



Bond Strength of Acrylic Resin to Cobalt-Chromium Alloy Treated with the Silicoater MD and Kevloc Systems

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ABSTRACT

Background

An optimum bond strength at the resin-metal interface of a prosthesis is essential to the success of that prosthesis. Silicoater MD and Kevloc are two systems used to increase bond strength at the resin-metal interface. This study investigated the effect that surface pretreatment and chemical shelf life had on the bond strength of silicoated samples and compared the shear bond strength of the two systems.

Methods

Test samples consisted of autocure denture resin attached to cylinders of chrome cobalt that had been treated either with the Silicoater MD or the Kevloc bonding system. The shear strength of the resin-metal interface was tested using a universal testing machine. The following variables were tested: various silicoating pretreatments; shelf-life period of the silanating chemicals; the method of silicoating. The shear strength of repairs using the Kevloc system were also tested.

Results

Surface pretreatment using aluminium oxide and sandblasting significantly enhanced the shear bond strength. The shelf life of the chemicals used in the silicoating process did not affect the bond strength over a six-week testing period. Samples treated with the Kevloc system showed significantly higher bond-strength values (17.3 ± 1.7 MPa) and less variability than samples treated with the Silicoater MD system (11 ± 3.6 MPa). In addition, all the samples repaired with the Kevloc system had bond strengths comparable to the original Kevloc-treated samples.

Conclusion

The Kevloc system has the potential to provide a more optimal resin-metal bonding system, a stronger and more consistent bond and a simpler laboratory technique.

MeSH Key Words: dental bonding/methods; denture, partial, fixed, resin-bonded; materials testing; silanes.

© J Can Dent Assoc 1998; 64:798-802
This article has been peer reviewed.

Introduction

The bond strength of the resin-metal interface of a prosthesis is a key factor in determining the serviceability of that prosthesis. Separation of the resin from the metal due to a compromised or weak bond can lead to microleakage, discoloration and total separation of the resin from the metal.^{1,2} Resin-metal bonding systems as an addition to

or replacement for conventional mechanical retentive elements aim at reducing the incidence of failure at the resin-metal interface. An optimum resin-metal bonding system would include a simple procedure producing maximum retention and high, consistent bond-strength values.³

Mechanical retentive elements such as latticework, mesh, beads and posts are incorporated into the

design of cast frameworks to retain the acrylic resin matrix. Additional design elements such as external and internal finish lines and tissue relief are used to ensure a sufficient bulk of acrylic for strength. Macromechanical retention may compromise the strength of the acrylic matrix by creating areas of strength concentration or by decreasing the thickness of the acrylic resin.⁴ The potential for



Fig. 1: Fractured resin veneer.



Fig. 2: Failure at the resin-metal interface.



Fig. 3: Resin-metal sample in the testing device.

separation of the resin from the metal is also influenced by the difference in thermal expansion coefficients of the resin and metal. Reducing or eliminating macromechanical retentive elements could potentially increase the strength of the resin-metal interface.

Micromechanical retentive elements and chemical bonding systems purport to decrease the necessity for macromechanical retention. They offer the advantage of reduced impingement of the metal framework on the resin matrix; with the increased bulk of resin comes increased strength. These elements and systems also have the advantage of a reduced gap at the resin-metal interface and therefore less susceptibility to microleakage.

Micromechanical means of retention include sandblasting, electrochemical etching and chemical etching.⁵ Chemical bonding includes adhesive cements, tin electroplating, porous metal coating, tribochemical coating and silicoating.⁶

A discussion of the clinical applications of resin-metal bonding and an in-depth review of the Silicoater MD and Kevloc systems appeared in our previous article.⁷

This laboratory investigation arose out of clinical observations of failures occurring at the resin-metal interface of prostheses that had undergone chemical bonding using silicoating (**Figs. 1, 2**). Our intent was to investigate various aspects of the chemical bonding technique in an effort to explain the variance in bond strength we were observing clinically. Our study used the Silicoater MD and Kevloc systems to bond acrylic resin to cobalt chromium alloy.

The study had three aims:

1. to determine the effect that surface pretreatment and chemical shelf life had on shear bond strength of silicoated samples;
2. to evaluate the differences in bond strength of samples treated with the Silicoater MD and Kevloc systems;
3. to determine the bond strength of samples that were debonded

and subsequently repaired using the Kevloc system.

Methods

Patterns were designed as cylinders 12 mm tall with a 6.5 mm diameter. The patterns were cast in cobalt chromium alloy (Vitallium) by a commercial laboratory (Austenal) and provided to the investigators for testing. The cast patterns were prepared for chemical bonding according to the manufacturer's (Kulzer Heraeus) written instructions for the Silicoater MD and Kevloc systems. Samples were prepared for testing by fitting a #9 hard copper band to the metal patterns, and filling the band to a height of 5 mm with autocure denture resin (Palopress Vario, Kulzer Heraeus). Samples were dry stored for one week, at which time the bands were removed.

All samples were shear tested in a universal testing machine at a constant cross-head speed of 1 ± 0.3 mm/min, 0.1 mm from the resin-metal interface (**Fig. 3**). Sample preparation and testing were conducted by one investigator.

Summary of the Investigation Components

1. Testing of silicoated samples treated with different sample pretreatments

Samples were divided into three groups: a control group that received no micromechanical pretreatment and the subject groups that were pretreated either with abrasion with 110- μ m aluminium oxide for 30 seconds or with abrasion with 250- μ m sand at 5.5 bar for 30 seconds. Twenty-four sam-

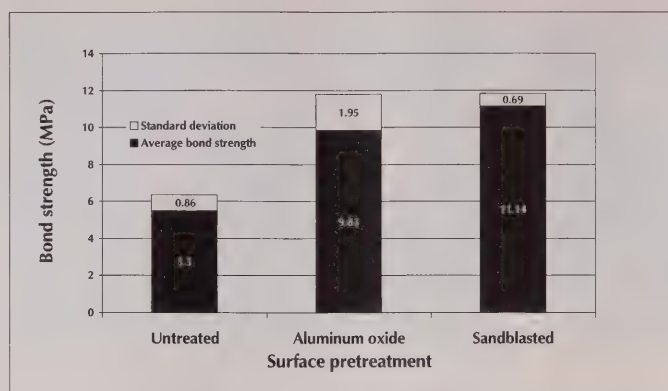


Fig. 4: Bond strengths for different surface pretreatments.

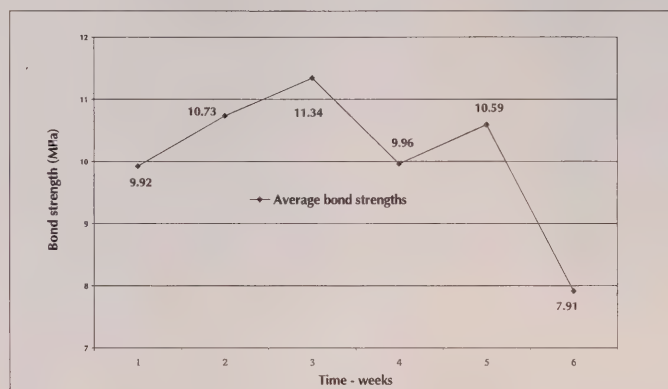


Fig. 5: Mean bond strengths as affected by chemical shelf life.

ples were tested weekly for four weeks, for a total of 96 samples.

2. Testing of silicoated samples over the chemical shelf-life period of the silanating chemicals

Samples in the subject groups that had received micromechanical pretreatment were prepared on a weekly basis and shear tested one week post preparation. The trial period was six weeks. Twelve samples were tested weekly, for a total of 72 samples.

3. Testing of samples prepared using either the Silicoater MD or Kevloc systems

Samples pretreated with 150- μ m aluminium oxide were prepared with the Silicoater MD or the Kevloc system and then tested one week later to determine the difference in shear bond strength between the systems. There were 12 samples in each group, for a total of 24 samples.

4. Testing of samples debonded and subsequently repaired using the Kevloc system

The samples tested in part 3 were debonded, repaired using the Kevloc system and then retested for bond strength one week after the repair. There were 10 samples in each group, for a total of 20 samples.

Before conducting the various study components, we conducted a pilot study to determine the sample size of the test groups. The pilot study tested different batches of the silanating chemicals Sililink and Siliseal. The same experimental protocol was used for all components of the study. Results of the pilot study indicated that different batches of the silanating agents did not affect mean bond strength. The silanating agents were evaluated over four weeks. Six samples in each group were tested weekly, for a total of 48 samples.

Results

The mean bond strengths for each test group were calculated and the values were statistically evaluated.

1. Effect of surface pretreatment on bond strength (n = 12)

There was a significant difference in bond strengths between untreated samples and samples pretreated to provide micromechanical retention. The method of providing micromechanical retention — aluminium oxide or sandblast abrasion — was not statistically significant according to a multiple analysis of variance ($p < 0.05$) (Fig. 4).

2. Silicoating as affected by the chemical shelf life

Samples pretreated to produce micromechanical retention were tested over six weeks. The shear bond strength over the period did not correlate to the age of the chemicals (Sililink or Siliseal). The difference in bond values was not statistically significant (Fig. 5).

3. Comparison of samples treated with either the Silicoater MD or Kevloc systems

Student's *t*-test demonstrated a significant difference between the two systems. The Kevloc treatment produced higher mean bond strengths than the Silicoater treatment ($p < 0.01$) (Fig. 6).

4. Repair of samples that were debonded and subsequently rebonded using the Kevloc system

The student *t*-test demonstrated no significant difference ($p < 0.05$) in bond strength for samples that had been bonded with either system, debonded and then repaired with the Kevloc system. All the repaired samples had a mean bond strength comparable to that of the original Kevloc-treated samples (Fig. 6).

Mode of Bond Failure

There are four classifications of bond failures:¹

1. adhesive failure between the alloy and bonding agent;
2. cohesive failure in the bonding agent;

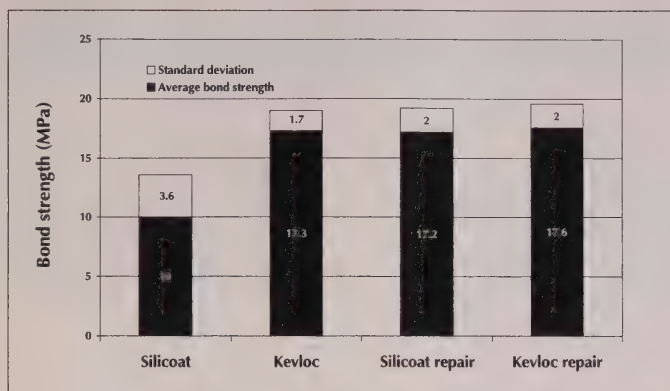


Fig. 6: Mean bond strengths with the Silicoater MD and Kevloc systems.

3. adhesive failure between the bonding agent and resin;
4. cohesive failure in the resin.

Visual inspection of photomicrographs and inspection under compound microscope revealed that the mode of failure had adhesive and cohesive elements. The silicoating treatment primarily demonstrated adhesive failure, while the Kevloc-treated samples primarily showed cohesive failure.

Discussion

As a pilot study we tested different batches of the silanating chemicals used in the Silicoater MD system. Statistically, the chemicals Sililink and Siliseal did not contribute to bond-strength variability among samples. Given the limited sample size and the number of batches tested, it is possible that a clinically significant bond-strength difference might occur due to chemical variance between batches. However, the variance in bond strength values demonstrated in this study was not attributed to any chemical variable, because the same batch of chemicals was used throughout the sample preparation. Similarly, the test procedures and investigator were constant throughout the study, in an attempt to control variation due to procedure or researcher.²

The first variable investigated for the Silicoater MD system was the effect of surface pretreatment. Several previous studies have evaluated this step, with conflicting recommendations on the necessity,

method and degree of pretreatment.^{3,8} The elimination of metal pretreatment would be an asset in both the lab and the clinic. In the lab it would eliminate a time-consuming and technique-sensitive procedure, thereby simplifying the technique. In the clinic it would reduce the potential for inadvertent damage due to alteration of the framework surface. Our results indicate that micromechanical pretreatment is required to produce stronger bonds than are achievable by silicoating alone. The pretreatment methods — aluminium oxide abrasion and sandblasting — are recommended in the literature or by the manufacturer. Both pretreatment methods produced similar bond-strength values in this study. The considerable amount of variation in bond-strength values among the samples probably contributed to the lack of distinction between the surface pretreatments.

The second variable investigated was the effect of chemical shelf life on bond strength. The manufacturer stipulates an optimum shelf life of four weeks for Sililink and Siliseal after opening. Prior to this investigation, we did not know whether a significant or gradual decrease in bond strength would occur as the shelf-life limit approached. We also did not know whether the shelf-life estimate was accurate. The relatively short shelf life may be a disadvantage for the laboratory, especially if the Silicoater MD is not used on a regular basis. Our results showed no specific trend nor sig-

nificant drop in bond strength during the six-week testing period. Bond-strength values were variable with no downward trend that would correlate to the age of the materials. The amount of material provided was insufficient to permit further testing beyond the six weeks. For chemicals subject to shelf-life limitations, using a small amount would help address the cost issue associated with a restricted shelf life.

The third aspect of our study investigated the bond strength of a relatively new bonding system, the Kevloc system. The Kevloc system produced the highest resin-metal bond strength; values were significantly higher than those attained with the Silicoater MD system. Furthermore, bond values for repaired samples of debonded Silicoater- or Kevloc-treated samples were comparable to the original Kevloc-treated samples. Additionally and importantly, the variation in bond-strength values was much smaller among the Kevloc samples than the Silicoater samples.

The mode of bond failure with silicoating appeared to be an adhesive failure at the metal-bonding agent interface. The weak link was the bonding mechanism, not the materials. The mode of failure of the Kevloc samples was primarily cohesive in nature, occurring in the resin or bonding-agent layers. The materials, not the bond, were the weak link.

The higher, more consistent bond-strength values achieved with the Kevloc system, as well as the cohesive nature of the failures, indicates that the Kevloc system more closely approximates the ideal resin-metal bonding system. The Kevloc system is also a simpler technique to use, as it has fewer steps and uses chemicals with no shelf-life limitations.

Summary and Conclusions

The purpose of this laboratory investigation was to determine the bond strength of acrylic resin bonded to cobalt-chromium alloy treated with either the Silicoater MD or the Kevloc systems. Our findings were as follows:

1. Surface pretreatment of the alloy to improve micromechanical retention produces significantly higher bond-strength values for silicoated specimens. The manner of surface pretreatment was not statistically significant.
2. Shear bond strength is not affected by aging of the silanating chemicals within the shelf-life period of the chemicals.
3. Compared to the Silicoater MD system, the Kevloc system produces significantly higher bond-strength values with less variation among samples.
4. Repair of debonded specimens using the Kevloc system produces a bond with strength comparable to that of the original Kevloc bond.

The Kevloc system comes closer to achieving the goal of an optimum resin-metal bonding system. The simpler laboratory technique and better results should

become the focus of future clinical investigation. ■

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The authors have no declared financial interest in any company manufacturing the types of products mentioned in this article.

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CLINICAL PRACTICE



Tongue Piercing and Associated Tooth Fracture

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ABSTRACT

The case presented is designed to draw attention to the increasingly common occurrence of tooth fracture as a result of trauma incurred from a barbell inserted during tongue piercing.

Oral piercing is on the rise. Of concern to health personnel are the associated risks, which include damage to dentition, infection, speech impediment and nerve damage. Also of concern is the belief that in some cases, clients considering body piercing may not be receiving sufficient care instructions, hence putting them at greater risk of post-operative complications.

We conclude that a public health campaign in the form of health promotion and education is mandatory to ensure safe responsible piercing, and recommend that workshops, forums and educational leaflets aimed at the piercers, the clientele and the health care workers be developed in Alberta.

MeSH Key Words: self-mutilation/complications; tongue/injuries; tooth fractures/etiology.

© J Can Dent Assoc 1998; 64:803-5
This article has been peer reviewed.

Body Piercing and Society

Although it has an ancient history, body piercing has only recently attained popularity in Western society.^{1,2} For centuries, body piercing was part of many cultures and religious rites.² Ancient Egyptians pierced their navels to signify royalty, Roman centurions wore nipple rings as a sign of virility and courage, and Mayans pierced their tongues for spiritual purposes.³ In North America, body piercing was also a tradition of the Sioux.⁵

Today, popular sites for body piercing include the ears, eyebrows, lips, nose, nipples, navel, penis, scrotum, labia, clitoris and tongue.^{4,5} Of significance to the

dental community is the recent increase in intraoral piercing,^{4,5} which is the insertion of jewelry into soft oral tissues including the lips, cheeks and tongue.¹ It is critical that the dental profession become aware of the recent interest in this type of body piercing, of the impact this trend may have on dentition and speech, and of the health risks that are associated with piercing.

The literature on the effects of tongue piercing is limited. What there is points to the risk of tooth damage, the possibility of aspiration of jewelry,⁴ speech modification,³ and an increased risk of infection.⁵ Furthermore, we suspect that body piercers do not pro-

vide sufficient health information to their clients. As a result of these findings, we present here a case of fracture and possible abrasion caused by a tongue ring in a 23-year-old Caucasian male. Although this case is not unique in its presentation, it serves to highlight for the dental profession some of the risks involved in intraoral body piercing.

Clinical Case

A 23-year-old single male presented himself to the University of Alberta undergraduate clinic complaining of "chipped molars and some worn teeth." The patient was a transient worker for an oil company. Long hours on the job and other personal factors induced a

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moderate level of stress. Aside from the fact that he was a smoker, his medical history was unremarkable. His past dental history had included extractions (third molars) and dental hygiene. Current clinical findings revealed no extraoral abnormalities. The intraoral exam revealed no carious lesions and good periodontal health, with a periodontal screening record (PSR) of 2.⁶

However, a number of distinct fractures involving enamel and dentin were observed on the incisal edges of teeth #12 and #31 and the lingual surfaces of #36, #46 and #16.

The soft tissues were all within normal limits with the exception of the anterior central area of ventral aspect of the tongue, which appeared slightly inflamed. The patient did not reveal the use of a ring until questioned about the inflamed areas, at which time he inserted the barbell-type ring (Fig. 1).

The patient also reported a tongue-thrusting habit with the additional parafunctional habits of grinding and clenching.

Upon questioning the patient as to the possible cause of the fractures, he indicated that he had obtained the ring eight months earlier and was having difficulty becoming accustomed to the presence of a foreign body in his oral cavity. The fractures had all occurred within the first month of obtaining the barbell. He also indicated some initial difficulty in speech and mastication following the piercing. Despite the patient's parafunctional habits, he indicated that he occasionally slept with the ring inserted. We conclude that this only served to compound the risk of trauma to his dentition.

Risks of Intraoral Piercing

Piercing of the tongue is normally performed in the midline of the tongue anterior to lingual frenum.⁴ Because of the swelling, it is recommended that a longer barbell shank initially be placed in the tongue, followed by the insertion of a shorter barbell shank after healing. (Significantly, the patient had not had the initial

tongue ring changed.) Because of the tongue's vascular nature, healing is generally quick, occurring within 4 to 6 weeks after the piercing.⁷ The procedure is usually performed without anesthesia. The protruding tongue is clamped and supported by a piece of cork, then pierced by a needle bearing equal gauge to that of the barbell stem.⁴

The patient said he had his tongue pierced simply because he "wanted to." While the reasons for piercing are varied, it is generally considered either a form of body art, fashionable, a "personal statement" or daring.⁷ Piercings are also sought for their sexual⁷ and spiritual benefits.^{4,8} Our patient also had his nipples pierced. Both his piercings were hidden and he had removed his tongue ring prior to presenting for the oral examination. There is some suggestion that body piercing is seen as deviant behaviour by society,⁵ which may explain why some individuals do not always present for their dental appointments with their pierced ring in place. Piercing should therefore be included in a list of differential diagnosis for any inflamed areas of soft tissue as it may not always be readily obvious.

There are a number of risks associated with the practice of intraoral body piercing that are of concern to the dental community. They include:

1. **Tooth fracture:** Our clinical case serves to illustrate one of the most immediate outcomes associated with intraoral piercing. In addition, when a patient reports parafunctional habits such as bruxism, it is not unreasonable to infer that the risk of tooth fracture increases. Individuals who choose piercing need to be made aware of this risk and that damage to the dentition may result in cracked tooth syndrome or outright fracture of the dental hard tissues with or without pulpal involvement.
2. **Speech impediment:** A review of the literature suggests that speech may be hindered.³ In one case, a student with a

pierced tongue was forced to remove his barbell because his speech was altered.³

3. **Aspiration:** It is not unreasonable to count as a risk the accidental aspiration of a piece of the jewelry inserted in the tongue should the jewelry come apart.⁴
4. **Infection and allergic response:** Infection from unsterilized instruments is always a risk. Body piercing is often done in the same establishments as tattoo studios.^{7,9} Despite performing invasive procedures, many body piercers do not have any formal education on sterilization, effective skin care and proper infection control.⁹ Consequently, piercing may include an increased risk of the transmission of Hepatitis B, HIV/AIDS, tetanus,⁶ syphilis and tuberculosis.⁵ The literature does not provide statistics on the risk of transmission of these diseases due to the lack of regulation on body piercing.⁵ Allergic reactions to nickel or other alloys used in the metals are also a possibility.⁷ All jewelry should be made of inert non-toxic metals⁷ such as stainless steel, 14K gold niobium or titanium.⁷ The patient reported that his barbell was made of stainless steel.
5. **Other:** A number of side effects associated with piercings have been documented,⁵ including pain, deep cyst formation, hypertrophic scarring, damage to deeper structures such as superficial veins and nerves, hematoma formation and neuroroma.⁵ Septicemia and toxic shock syndrome have also been reported in cases of severely infected body piercings.⁴ It is not unreasonable to infer that other risks specific to the practice of tongue piercing may include damaged cheek tissue, permanent numbness and loss of taste.

Many piercers are not professionals. It is suggested that in some cases, post-operative instructions are inadequate. Proper post-operative instructions should

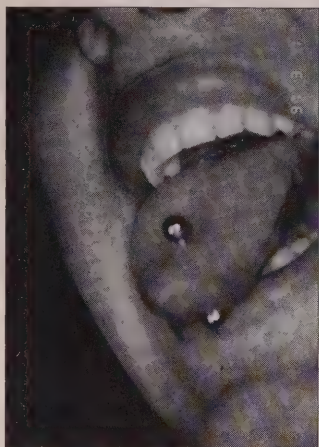


Fig. 1: Barbell rings ... a risky fashion option?

include information on the care of the pierced site; for tongue piercing, that means frequently using a mouth rinse and avoiding alcohol, spicy foods and smoking.⁷

Learning More About Piercing

It is clear from the literature that whether health professionals like it or not, body piercing will continue.⁹ As a result, they need to know about the procedure to be able to provide helpful information.² Health professionals and the general public still have much to learn about the effects of tongue piercing on the integrity of dentition and speech, and the risk of infection. It is also important that they understand the motivation and feeling of gratification that compel people to choose body piercing in spite of these possible complications. Based on the literature and the case presented, it is clear that damage from such piercing should be of concern to the dental profession.

Recommendations

As health care professionals, we need to be aware of the procedures and risks involved in tongue piercing, and of the social and psychological reasons that lead people to engage in this practice regardless of the risks.

Hence, it is proposed that leaflets addressing the issues for

both health care professionals and the public be prepared and distributed as a public health education measure. This would enable us to advise patients who may be pierced as to the procedures they should follow and the risks they may face. It is also proposed that a survey be conducted to investigate the practices of body piercers in Edmonton and the knowledge of their clients. ■

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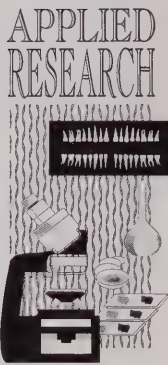
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Tooth bleaching update



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Dental Screenings Using Telehealth Technology: A Pilot Study

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ABSTRACT

Background

This pilot study compared data obtained using traditional methods of visual dental screenings in a school setting with data obtained using an intraoral camera and transmitted to a distant location via telehealth technology.

Methods

For the study, 137 schoolchildren were screened using traditional methods. Two months later, 32 children were randomly selected and rescreened in a single day using the intraoral camera and the telehealth system. The measurement indices used were deft/DMFT.

Results

A comparison revealed no significant difference in the data collected by the two screening methods. The percentage agreement between the methods ranged from 89% to 100%.

Conclusion

In under-served or remote areas, the telehealth system may allow for accurate identification of oral conditions and act as a means of consultation at a distance between specialists, general dental practitioners, dental hygienists and individual patients.

MeSH Key Words: dental care; rural health services; telemedicine/instrumentation.

© J Can Dent Assoc 1998; 64:806-10

This article has been peer reviewed.

Introduction

Telehealth is a joining of telecommunications technology with health delivery. Using interactive video, audio and computer technologies as the information transfer platform, medical information can be transmitted over long distances between urban centres and under-served rural areas.¹

Through the use of conventional telephone lines, microwaves or satellite link-ups, physicians at a central medical hub can examine and treat patients at multiple satel-

lite locations.² Telehealth can be used for situations in which (1) physical barriers prevent the ready transfer of information between the health care professional and patient, and (2) information availability is key to proper medical management.³

Much of the framework for telehealth technology is currently in place. Telephones have proven to be economical and reliable for data transmission.⁴ Many dental offices are already equipped with intraoral cameras, video monitors and computers,⁵ and digital imag-

ing systems⁶ are becoming more widespread.

The University of Alberta Telehealth Centre is the collaborative effort of an interdisciplinary health committee. The Telehealth Centre is currently linked to the Two Hills Health Care Centre in eastern Alberta, and steps are being taken to expand telehealth sites to other communities in the province. Many health disciplines including dentistry could make use of this technology in delivering clinical diagnostic services to remote areas that are unaccessed by



Fig. 1: Dental hygiene students operating telehealth equipment at Two Hills site.

dental specialists or, in some cases, general dental practitioners.

Many dental public health programs are involved in oral health screenings in school settings throughout the province. This level of programming requires moving equipment and qualified staff to remote locations. It does not allow for direct consultations with dental practitioners since public health dental hygienists or assistants complete this work. As telehealth technology spreads across the province, dental programs could potentially utilize this mode of communication for consultations, diagnostic appointments, data collection and post-treatment evaluation.

This pilot study investigated whether the use of telehealth communication technology and intraoral cameras for completing visual oral health screenings would be comparable to visual screenings in the traditional school setting. Implementation of such technology could potentially reduce the need for highly trained health workers to commute to and from remote areas for purposes of screenings, oral diagnosis and referral. In addition, if images transmitted via telehealth technology correspond to those seen in person, then consultations between specialists in central locations and health care workers in remote areas could be carried out.

Methods and Materials

The University of Alberta Telehealth Centre was established utilizing the LinkCare^{fi} System, which

was developed by Hughes Training Inc., an Arlington, Texas, company. LinkCare^{fi} has a modular design that allows for different levels of equipment and capability that are open, upgradeable and easily integrated. The system ranges from full diagnostic treatment to triage/monitoring, and includes fully interactive audio and video components that transmit consultations, medical databases, real-time ultrasound and moving images (ECGs), heart, lung and blood flow sounds, radiographs, EKGs, EEGs and other diagnostic study records, live video pictures of affected body parts and tissues, and precise still images.

The link between the Telehealth Centre and Two Hills is via telephone lines, although capacity for satellite, microwave and cellular transmission is also a possibility for future connections. A coder-decoder device (CODEC) digitizes and compresses the video and audio signals and transmits images using a relatively small, narrow bandwidth. There are two 20-inch monitors with standard resolution, one for viewing the local site and one for viewing the distant site. The sites are connected by a two-way audio system. Both sites have document cameras with graphic capabilities for presenting still images only and single-chip cameras, which can be panned, tilted and zoomed locally or remotely by a touchscreen controller. The touchscreen controller is used to control all of the operations except the computer. Each site has a VCR, a computer, and diagnostic instruments. A patient camera at

the remote site allows for a greater degree of magnification and detail resolution in transmitting live images.⁷ The intraoral camera system utilized was the Reveal^{fi} system by Patterson Dental.

The subjects for the pilot were children who attended Two Hills Elementary School and who had received parental consent for the regular public health dental screening. A total of 137 children were screened at the school by a registered public health dental hygienist and a registered dental assistant (who acted as recorder), both of whom had been trained by the regional dental officer. This initial screening was to provide baseline data using the traditional method of data collection in the school. The indices used were deft/DMFT. An intraoral mirror, a portable chair and a light source were utilized. Appropriate infection control procedures were followed. All of the 137 children were given a letter of consent for the second screening explaining the purpose of the telehealth screening and the methods employed.

Two months later, the second screening was carried out on 32 randomly selected children in each grade who had received parental consent for the telehealth screening. After time for travel and equipment set up at the Two Hills Health Care Centre, the children were screened using the intraoral camera. Of the 32 screenings, only 27 data results were analyzed as five children had lost teeth in the two months since the school screening, thus altering the deft/DMFT scores from the original screening.

Three dental hygiene students and the regional dental officer conducted the telehealth screenings. One student operated the intraoral camera while another assisted with the children. The same portable light source, intraoral mirrors and infection control procedures were employed as in the school screenings. The images picked up on the intraoral camera were transmitted to the Telehealth Centre, where the same dental hygienist and dental assistant who had participated in the first screening received and

Table I

Screening Results for the Primary Dentition (deft Index)

Number of Teeth	School Screening Number of Children	Telehealth Screening Number of Children
Decay		
0	22	24
1	4	2
2	0	1
3	1	0
To be extracted		
0	23	23
1	3	3
2	1	1
Filled		
0	17	17
1	3	3
2	2	2
4	1	1
5	2	2
6	1	1
9	0	1
10	1	0

Table II

Screening Results for the Permanent Dentition (DMFT Index)

Number of Teeth	School Screening Number of Children	Telehealth Screening Number of Children
Decay		
0	26	24
1	0	2
2	1	1
Missing		
0	27	27
Filled		
0	21	21
1	4	4
2	1	1
3	1	1

Table III

Inter-method Agreement and Reliability for School and Telehealth Screenings

Index Category	% Agreement	Kappa Statistic
Primary decay	89	0.58
Primary to be extracted	100	1.0
Primary filled	96	0.93
Permanent decay	93	0.50
Permanent missing	100	1.0
Permanent filled	100	1.0

interpreted the images using deft/DMFT as their indices.

The telehealth equipment involved two TV monitors (**Fig. 1**). One monitor displayed the camera image being sent to the other location and the other monitor displayed the image being received from the distant site. Audio communication was also available. All verbal communication was clear and understandable. If any difficulty in visualizing a particular surface of a tooth was noted, requests for the camera to be moved were made by the recorders at the Telehealth Centre.

The results of the first and second inspection were compiled through a spreadsheet, charting both the deft and DMFT. The score and number of errors were analyzed for percentage agreement. Chi-squared tests indicated that there were no significant differences between the two screening methods, and statistically, the results were similar.

Results

The initial baseline data obtained from the visual oral health screenings in the school were compared with data obtained from the telehealth screenings for primary tooth decay, primary teeth needing extraction, and primary restored teeth (deft index), and for permanent tooth decay, permanent teeth missing due to caries and permanent restored teeth (DMFT index). Only small variations occurred between the two methods (**Tables I** and **II**). Chi-squared tests were used at $p < 0.05$. The groups showed no statistically significant differences.

Kappa statistics⁸ were applied to the data to determine agreement in excess of that expected through chance (**Table III**). Perfect agreement existed for the three categories of primary teeth to be extracted, permanent teeth missing and permanent teeth filled. For both the primary and permanent teeth with decay groups, the kappa statistic showed moderate agreement, and for the group in which primary teeth were to be filled, the agreement was very good. The

percentage agreement between the traditional school visual screening and the telehealth screening was very close, and in those areas where variation occurred, the kappa agreement showed moderate to very good agreement.

Overall, the screening results between the traditional and telehealth methods of performing dental screenings were similar, with no difference found in the areas of detection of primary teeth to be extracted or filled, and permanent missing teeth.

Discussion

Though not new to medicine, telehealth technology has not become part of every day health care or dentistry. Technical immaturity, economic feasibility and legal considerations may be partly responsible for its restricted role. Cost-effectiveness is also an important consideration in evaluating its potential use. Capital equipment costs for the telehealth system are very high and will vary from facility to facility. The cost of the LinkCare[®] System, which can have many equipment configurations, can range from approximately \$40,000 to \$130,000. For dental screenings to be cost-effective using this system, it would likely be necessary for the telehealth infrastructure to be already present. Alberta Health is currently considering expanding the telehealth equipment to more sites within the province, which would allow a piggyback effect for completing dental consultation and screening services without having to purchase and install equipment solely for that purpose. If a health facility or clinic purchased telehealth equipment, then the capital costs could be passed on in the form of user fees for the clinicians or groups utilizing the equipment.

This study showed that a number of factors contributed to the cost of each process. Both types of screenings involved a team consisting of a dental hygienist and a dental assistant. Extra personnel were required at both the school and the telehealth facility to help with getting the children to and

from the screening site. Set-up time was similar in both settings. Although the telehealth screening time per child was initially a little slower, experience with the system eventually allowed for the two types of screenings to take about the same amount of time.

There were, however, differences between the two methods that would impact on any cost-benefit analysis. The school dental screenings involved the cost and time of travel for the dental staff to go to the school. For the telehealth screenings, the costs involved transporting the children from the school to the health facility (which in this case were assumed by the school), the cost of having a trained person operating the intraoral camera (which may or may not be a person with dental training), and the cost of using the telehealth equipment.

There was no cost to the public health dental program for utilizing the Two Hills Health Centre equipment, as both groups belong to the Lakeland Regional Health Authority. If a system were to be used on a regular basis, and the capital and transmission costs factored into any user fees, then the investment would eventually be covered. Hopefully, the individual cost of using such equipment would not be too prohibitive. Further studies are needed to investigate the very real issue of the economic viability of this technology.

The merits of the telehealth screening method include the fact that it is a potentially mobile system that can be manipulated by trained, non-dental personnel. The telehealth system also allows for clear communication of visual and audio data over great distances, all in real time, thereby significantly reducing travel time and costs for both practitioner and patient. (It can also accommodate patient assessments, history taking, transmission of digital data, radiographs and still images, either in real time or on videotape for later use.) The technology could also be used for real time, pre-authorization for dental insurance benefits.

Potential weaknesses of this method include the cost of equipment, especially in start-up cases. As well, for clinicians unaccustomed to using an intraoral camera, some preparation time and practise in visualizing the teeth and oral cavity is required. Training of the distant health care worker in the use of the intraoral camera is also necessary. It was noted, for example, that care needs to be taken during the transmission of the visual image to ensure that correct colour tone and brightness are achieved. Furthermore, if the screening is to be completed without the use of explorers, there will be an accompanying loss of detail in the data recorded as no tactile information will be transmitted. The system was found to be most effective in identifying missing and filled teeth, probably because these two areas are easily visualized and do not require tactile sense to detect. Another reason for this may be that there were very few teeth in these index categories. The percentage agreement in these categories was predominantly on sound teeth. Less agreement was observed in the detection of decay.

No explorers were utilized in the study. It is possible that the dental hygienist was so accustomed to using an explorer for detecting decay that she found using only visual detection less definitive or reliable than detection using tactile sensation. In addition, visual detection of decay may have been hindered due to the unfamiliarity with intraoral viewing of teeth. These factors could have introduced variability in the recording of carious lesions and would have potentially decreased her intra-examiner reliability. If concern existed in a clinical setting about the loss of detailed diagnostic information as a result of not having the remote inspections completed with the use of an explorer, both digital radiographs and standard films could be easily transmitted to enhance the information being collected.

The population pool of the study was small due to time

constraints on that school day and to the fact that five children out of the 32 had lost some of their teeth, which impacted on their deft score. Their inclusion in the study would have inappropriately reduced the statistical accuracy of the telehealth screenings. In retrospect, it would have been prudent to reduce the time interval between the first and second screenings to avoid the potential for change in the deft/DMFT status as a result of exfoliation or dental treatment.

Conclusion

This pilot study indicated that the data collected using the telehealth system was similar to that of the traditional, intraoral visual screenings currently completed in public health dental programs. The telehealth system enables reliable, remote observation of oral conditions such as decayed, missing and filled or extracted teeth. It is used to transmit oral images to dental hygienists, dentists or specialists in urban centres for consultation or educational purposes (for example, communication with dental students in satellite locations). Although digital imaging is becoming more widespread and available in dentistry, the use of telehealth technology in remote dental screenings will depend on the existence of telehealth equipment throughout the province. The extensive cost of establishing telehealth sites will require financial support and a utilization across a broad spectrum of health care disciplines. Although networking of this technology may require some initial cost and implementation time, once fully developed, the system could offer a simple and reliable alternative to remote dental care. ■

Acknowledgment: Special recognition and thanks go to the following dental hygienists and assistants for their invaluable assistance in carrying out this project: Shari Holland, Cory McQuaig, Patrick Miklos, Jennifer Parsons, Afæe Rodwell, Sandy Tillotson and Sherry Kokotailo.

The cooperation and support of the Lakeland Regional Health Authority, Two Hills Health Care Centre and Two Hills Elementary School was greatly appreciated.

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The authors have no declared financial interest in any company manufacturing the types of products mentioned in this article.

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B.S., D.M.D., M.Sc.D.
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Pennsylvania
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Canadian Equity Fund (Trimark) ^{††}	-7.2%	9.6%	8.3%	10.3%	✓
Special Equity Fund (KBSH) ^{†‡}	-21.6%	27.2%	19.3%	n/a	✓
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Pacific Basin Fund (KBSH)	2.2%	1.5%	n/a	n/a	✓
US Equity Fund (KBSH) ^{†‡}	7.9%	20.8%	17.2%	16.9%	✓
Global Fund (Trimark) ^{†‡}	-0.8%	11.9%	13.0%	14.9%	✓
Global Stock Fund (Templeton) ^{†‡}	7.3%	n/a	n/a	n/a	✓
S&P 500 Index Fund (Sun Life of Canada) ^{††}	32.5%	31.2%	24.4%	20.0%	✓
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[†] Returns shown are those for the following funds in which CDA funds invest: ¹Trimark Canadian Fund, ²KBSH Special Equity Fund, ³KBSH US Equity Fund, ⁴Trimark Fund, ⁵Templeton Global Stock Trust Fund, ⁶McLean Budden Fixed Income Fund.

^{††} Returns shown are the total returns for the indexes tracked by these funds.

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INTERNATIONAL



January 16-23, 1999

42nd International Alpine Dental Conference in Courchevel, France. Contact Marie-Ange Vitry, International Dental Foundation, 53 Sloane St., London SW1X 9SW, U.K. Tel.: 44 (0) 171 235-0788; or fax: 44 (0) 171 235-0767.

March 6-13

15e Forum de l'Association internationale francophone pour la formation continue en odontologie (AIF-FCO), en Guadeloupe, avec la collaboration de la Faculté de médecine dentaire de l'Université Laval, Québec. Contact: Dr. Christian Bernard, Faculté de médecine dentaire, Université Laval, Québec. Tel.: (418) 656-5018; fax: (418) 656-2720; or e-mail: Ruth.Turcotte@fmd.ulaval.ca

March 20-27

43rd International Alpine Dental Conference in Courchevel, France. Contact Marie-Ange Vitry, International Dental Foundation, 53 Sloane St., London SW1X 9SW, U.K. Tel.: 44 (0) 171 235-0788; or fax: 44 (0) 171 235-0767.

CANADA



December 4-5

Annual Meeting of the Association of Prosthodontists of Canada in

association with **The Greater New York Academy of Prosthodontics** in New York, NY. Contact Ms. Jennifer Rogers. Tel.: (905) 305-9373; or fax: (905) 886-8913.

December 5

Prosthodontics Series #2 - Bonded Prostheses — Contact the University of Western Ontario, Faculty of Medicine and Dentistry, Continuing Education and Professional Development, Room H121, Health Sciences, London, ON N6A 5C1. Tel.: (519) 661-2074; 1-888-281-1428; or fax: (519) 661-3797.

February 12, 1999

16e Journée scientifique de la Faculté de médecine dentaire de l'Université Laval in Quebec. Contact Mr. Charles Garon, Formation continue, Pavillon Louis-Jacques-Casault, Université Laval, Québec G1K 7P4. Tel.: (418) 656-3202; or toll-free: 1-800-561-0478, ext. 3202; or fax: (418) 656-5538; or by e-mail: charles.garon@dgfc.ulaval.ca

March 10

Symposium on Orofacial Pain — From Basic Science To Clinical Management at the Simon Fraser University, in Vancouver, BC. Contact Lucille Gendron by fax: (514) 343-2233; or e-mail: gendrol@medent.umontreal.ca

March 17-20

Western Canada Dental Society Curling Bonspiel and Seminar in Edmonton, Alta. Contact Dr. Rick Brisbane, 304-8225 105 St., Edmonton AB T6E 4H2. Tel.: (403) 439-6037; or fax: (403) 439-0145.

U.S.A.



February 3-6, 1999

6th Annual Conference and Exhibition Of the Academy Of Laser Dentistry in Palm Springs, Calif. Contact the Academy Of Laser Dentistry, 10435 Vernon Ave., Huntington Woods, MI 48070-1526. Tel.: (248) 548-7171; fax: (248) 548-7174; or e-mail: acohen@laserdentistry.org

February 5-13

Pennsylvania Academy of General Dentistry's 9th Annual Caribbean Winter Seminar in St. Martin/St. Maarten. Contact Dr. Tom Howley. Tel.: (215) 699-8751; fax: (215) 699-5618; or e-mail: TAHOWLEY@aol.com

February 11-13

Miami Winter Meeting and Dental Expo in Miami, Fla. Contact the East Coast District Dental Society, 420 S. Dixie Hwy, Suite 2E, Coral Gables, FL 33146-2271. Tel.: 1-800-344-5660; (305) 667-3647; or e-mail: ecdds@ecdental.org

February 26-28

Barbados Dental Association's 11th Annual Mid-Winter Convention, in Barbados, W.I. Contact Mrs. Fay Mack, Barbados Dental Association, 17 Pine Rd., Belleville, St. Michael, Barbados, W.I. Tel.: (246) 228-6488; or fax: (246) 228-6488. In Canada, contact Lynne Brandon, tel.: (519) 657-4306 (evenings); or fax: (519) 472-9120; or Mr. Jerry Sheppard tel.: (519) 434-1647 (days); or fax: (519) 434-4936.

March 4-6

14th Annual Meeting of the Academy of Osseointegration in Palm Springs, Calif. Contact the Academy Headquarters, 401 North Michigan Ave., Chicago IL 60611-4267. Tel.: (312) 321-5169; or fax: (312) 321-5150; or by e-mail: academy@osseointegration.org

DENTAL MEETINGS



January 28-30, 1999

Manitoba Dental Association Annual Meeting in Winnipeg, Man. Contact Mr. Ross McIntyre, Tel.: (204) 988-5300; or fax: (204) 588-5310.

February 18-20

Pacific Dental Conference At Vancouver in Vancouver, B.C. Contact

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Journal

December
1998
Vol. 64
No. 11

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4972 (afternoons). D380

**BRITISH COLUMBIA - North
Vancouver:** Central Lonsdale. Dental
practice for sale. Please call Mr. Brian
Dougherty at (604) 986-7307. D377

BRITISH COLUMBIA - Penticton: Busy
family practice for sale - located in strip
mall in Penticton. Existing dentist would
like to stay on as partner or part-time
associate. Fax (250) 493-1986 or tel.
(250) 493-0020. D353

BRITISH COLUMBIA - Vancouver:
Urban sophisticate wanted for downtown
Vancouver, British Columbia waterfront
dental office. We are a professionally
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tions in the Vancouver downtown core.
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right dentist, but there is a catch. You
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excellence in clinical skills, patient ori-
ented and be willing to either teach part
time or be involved in study clubs. Female
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humour and good endodontic skills.
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stating your philosophy and goals to: Dr.

Armstrong, Managing Doctor, Aarm
Dental Group, (604) 683-5468. D331

BRITISH COLUMBIA - Victoria Area:
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dentist desires purchase or partnership in
Victoria, B.C., or surrounding communi-
ties. All offers will be given serious con-
sideration. Please reply in confidence to:
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NEW BRUNSWICK - St. George: Dental
practice for sale in beautiful St. George,
New Brunswick, only 40 minutes west of
Saint John. The office is located in a totally
renovated building on the main street
entering the town, and is further enhanced
by its exquisite view of the river. The prac-
tice is grossing in excess of \$300,000 per
year and growing! An associateship/buy-in
situation is negotiable as well as living
accommodations. For further information
please contact: Laura Mitchell, tel. (506)
633-8485. D314

ONTARIO - Kingston: Ultra-modern gener-
al practice for sale. Main thoroughfare
exposure. All new equipment. Two opera-
tories plus one plumbed. Computerized
intraoral camera with ceiling-mounted TVs.
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ational activities. Owner pursuing graduate
studies. Tel. (613) 389-2031 (evgs.). D378

ONTARIO - Hamilton: General family
practice grossing \$600,000+ involving
restorative and preventive areas. In busy
downtown professional building; two
operatories and one full hygiene unit.
Great staff and dentist willing to stay for
transition. Please address all enquiries to:
Mr. Robin Wydryk, c/o Scott & Batenchuk,
3600 Billings Court, Ste. 301, Burlington,
ON L7N 3N6 or call (905) 632-5978 or
fax (905) 632-9068. D386

ONTARIO - Ottawa: Dental practice for
sale. Ideal for new graduate. Excellent
location. Reply to: CDA Classified Box #
2763. D382

ONTARIO - Hamilton Mountain: Prime
location. General practice for sale.
Established 12 years ago; 1,500 sq. ft.
with six operatories, two fully equipped,

computerized. Owner relocating. Please reply to: fax (905) 523-4414. D359

QUEBEC - Ouest de l'île de Montréal: À vendre: clientèle familiale triée sur le volet, principalement anglophone, avec grande possibilité d'expansion. Dentisterie de haute qualité professionnelle. Clinique de deux salles avec possibilité d'une troisième. Salle de radiographie/stérilisation. Assistante dentaire diplômée disponible. Transition rapide mais bien supportée. Gilles Gauthier, FCA, tél. (515) 695-2606. D385

QUEBEC/ONTARIO - Ottawa-Outaouais: Clinique moderne, en pleine expansion. Propriétaire-associé doit vendre sa pratique. Raison: obligation familiale. Facturation annuelle: 330,000\$ et plus. Possibilité de transition. Communiquez avec Louise au (819) 246-9191, a/s Dr. Lavergne. D354

QUEBEC - Montreal: Dental office space to rent or share with two other dental offices or for an associate. Located just across from the subway-Metro Snowdon. Please call (514) 484-3110 or (514) 488-9648. D352

SASKATCHEWAN - Central: Well-established (15+ years), busy, modern, rural general practice for sale. Three operatories and a private office. Only dentist in town with a large drawing area. Opportunity to practise all types of dentistry; 1,000+ active patients, most with dental insurance. Town is close to Saskatoon and Regina. Owner retiring. Priced to sell. Reply to: CDA Classified Box # 2762. D383

SASKATCHEWAN - Southeastern: Owner retiring. Step into well-established dental practice in southeastern Saskatchewan in resort area with waterslides, golf courses, fishing, beaches and many other amenities. Close to Manitoba and U.S. borders. Computerized recall with 2,400 active files. Large trading area. Satellite clinics available. Low overhead. Buy in at give-away price. Available for transition. Reply to: CDA Classified Box # 2760. D376

Positions Available

ALBERTA - Edmonton: Part-time associate required for progressive, quality-oriented family practice. Applicant must be very personable and have an interest in pro-

ducing quality cosmetic dentistry. Please fax resume to (403) 438-6939 or tel. (403) 437-4816. D366

BRITISH COLUMBIA - Central Vancouver: Very busy oral and maxillofacial surgery practice is seeking an associate/partner. New facility, excellent staff, three hospitals including trauma coverage for a nearby 447-bed, acute care facility. Please reply in confidence to: CDA Classified Box # 2757. D360

BRITISH COLUMBIA - Central Vancouver Island: Progressive dental practice in Campbell River requires an associate interested in future partnership and eventual buyout later. Campbell River is one of the fastest growing areas in B.C. The outdoor opportunities are unlimited and the quality of life doesn't get any better. We provide high quality dentistry in a new office with six operatories and modern, state-of-the-art equipment in own building in prime location. Experience preferred. Hours negotiable. Please reply to: Fax (250) 923-4093. D347

BRITISH COLUMBIA - Kelowna: Opportunity for associate with a view to purchase. Established, productive practice, great location, new equipment, computerized (Byte). Fun staff and pleasant environment. Tel. (250) 764-8509 (res.); PO Box 29104, Okanagan Mission, Kelowna, BC V1W 4A7 D304

MANITOBA - Oakbank: Part-time associate wanted for modern, rapidly growing practice. This attractive office is located 20 minutes from Winnipeg, in a rapidly growing family oriented town. Successful candidate must be highly motivated, caring, gentle and like working with children. A minimum of 2 years experience is required. Tel. (204) 989-2231, please leave message. D278

NORTHWEST TERRITORIES - Hay River: Canadian-certified associate required for busy, modern, well-equipped family practice. Fully qualified and experienced staff. Opportunity to travel to outlying communities. We are seeking a motivated, caring individual who works to a high standard and is prepared to make a long-term commitment. This is an ideal opportunity to generate a high income under excellent clinical conditions. Please call Dr. Joe Keates, (867) 874-6663 or fax (867) 874-2130. D363

NORTHWEST TERRITORIES - Yellowknife: Canadian licensed dentists. Full-time associate position available in Yellowknife.

Modern, computerized, centrally located clinic. Travel to outlying communities necessary. Exciting opportunity. Forward resume to: PO Box 2615, Yellowknife, NT X1A 2P9 or fax (867) 873-5032. D267

NORTHWEST TERRITORIES - Yellowknife: Canadian certified dental associate required for a modern family dental practice with pleasant support staff. The clinic is located in the city of Yellowknife. Seeking a caring motivated individual interested in a long-term position. Please reply to: CDA Classified Box # 2705. D012

ONTARIO - Ottawa: Busy Ottawa practice requires a part-time periodontist to provide periodontal care 1 to 2 days per week. Send resume to: PO Box 74166, 35 Beechwood Ave., Ottawa, ON K1M 2H9. D379

ONTARIO - Toronto: Cost sharing. Bay/Bloor office looking for dentist with own patients to share cost. Excellent opportunity for new graduates to start. Super-modern facility, computerized, digital X-ray, intraoral camera, panorex, continental delivery. Near subway. Call Dr. Ren, (416) 967-0100. D387

ONTARIO - Cambridge: Oral maxillofacial surgeon - excellent opportunity! Full or part-time in well-established, new facility, multispecialist office. Growing community of 102,000. Associateship available. Please contact: M. Viol, tel. (519) 623-3810 or fax (519) 623-1760. D361

ONTARIO - Hamilton Mountain: Part-time associate required for progressive group practice. This position involves evening and weekend hours and will lead to full time/partnership for the right candidate. Please forward resume to: Mountain Mall Dental Office, 673 Upper James St., Unit 46, Hamilton, ON L9C 5R9 or call Shirley at (905) 387-4780. D362

ONTARIO - Sarnia: Experienced associate dentist required to work with me in a well-established, high-gross family dental practice. We are an up-to-date and progressive office with emphasis placed on esthetic dentistry. This is an outstanding opportunity for the right candidate to become a future partner/purchaser. Our office is a large, spacious facility with all modern updates and a warm and friendly long-time staff. Our practice is pursuing the esthetic end of dentistry and an associate is needed to handle routine day-to-day dentistry while gaining experience in the cosmetic field. I am looking forward to

meeting someone already experienced who is interested in this long-term, interesting position. Please contact: David M. Rapaich, DDS, 230 North Vidal St., Sarnia, ON N7T 5Y3; tel. (519) 336-1270 or fax (519) 336-5107 or e-mail king-pin@ebtech.net D365

SASKATCHEWAN - Moosomin: Locum dentist required for maternity leave, April 1, 1999. Well-established, busy family practice in new facility, equipped with panorex/ceph unit. Hygienist and therapist on staff. Moosomin is a progressive town located on the Trans Canada Highway, 2 hours east of Regina. Please reply to: Dr. P. Biglow-Lecomte or Marie, tel. (306) 435-3080 (days), (306) 435-2901 (evgs.) or fax resume to (306) 435-2017. D375

YUKON TERRITORY - Whitehorse: Associate required for a five-chair dental clinic. We are looking for a person committed to quality dentistry and interested in a long-term relationship. Tel. (867) 668-4618, fax (867) 667-6824. D358

BERMUDA: Wanted, left-handed locum for dental practice in Bermuda, Apr. 26 - May 25, 1999. Practice located in front yard of residence. Tel. (441) 236-5298, fax (441) 236-0666. D384

Positions Sought

ONTARIO - Ottawa area: Dentist with 20 years experience seeking associateship, full time / part time in Ottawa or area. Reply to: CDA Classified Box # 2761. D381

Meetings & Courses

Continued from page 823

Ms. Marilynne Webster. Tel.: (604) 714-5303; fax: (604) 736-3645; or Web site: www.pdconf.com

March 26-27

CDA Board Of Governors Interim Meeting in Ottawa, Ont. Contact Ms. Suzanne Burton. Tel.: (613) 523-1770, ext. 2201; or 1-800-267-6354.

April 29 - May 1

Ontario Dental Association 132nd Annual Spring Meeting in Toronto, Ont. Contact Ms. Diana Thorncroft. Tel.: (416) 922-4162, ext. 346; fax: (416) 922-9005; or e-mail: pdasm@oda.on.ca

May 25-30

93rd Annual General Meeting of the Alberta Dental Association in Jasper, Alta. Contact Dr. E.W. McIntyre. Tel.: (403) 484-1336; or fax: (403) 489-4930.

May 27-29

Prince Edward Island Dental Association Annual Meeting in Woodstock, P.E.I. Tel./Fax: (902) 892-4470.

May 29 - June 2

28e Congrès annuel de l'Ordre des dentistes du Québec in Montreal, Que. Contact Mrs. Nicole Pagé. Tel.: (514) 875-8511; or fax: (514) 393-9248.

June 4-5

New Brunswick Dental Society Annual Meeting in Saint John, N.B. Contact Mrs. Barb Wishart. Tel.: (506) 452-8575; or fax: (506) 452-1872.

June 19-20

Nova Scotia Dental Association Annual Meeting in Pictou, N.S. Contact Mr. Steve Jennex. Tel.: (902) 420-0088; or fax: (902) 423-6537.

Notices of meetings and continuing education courses are published without charge for appropriate **not-for-profit** dental organizations, teaching facilities or recognized study clubs. Information must be received two months prior to the expected publication date, and will be published at the discretion of the editor. Send all requests c/o Ms. Rachel Gali-peau, Journal editorial assistant, Canadian Dental Association, 1815 Alta Vista Dr., Ottawa, ON K1G 3Y6.

Book Reviews

Continued from page 775

have on human remains and outlines procedures for their analysis. In the chapter by Sledzik, factors affecting decomposition rate are explained. There is also a chapter on the use of dogs in the search for cadavers. Methodologies for the estimation of age, sex and ancestry are covered by several authors in the section on biological profile, while Suchey and Katz define the traits used in their pubic aging system and consider the problem of individual variation. Weaver, meanwhile, updates his findings on the analysis of field remains. In chapter 13, Nawrocki re-examines the issue of cranial sutural closure and aging.

This reviewer was favourably impressed with the breadth and depth of material discussed and with the editor's ability to orchestrate a cohesive and consistent style between authors. The book, which complements the editor's first edition, is well organized and includes accurate references. It is recommended reading for those with basic knowledge in forensic anthropology.

Books reviewed by:

Robert B.J. Dorion, B.Sc., DDS,
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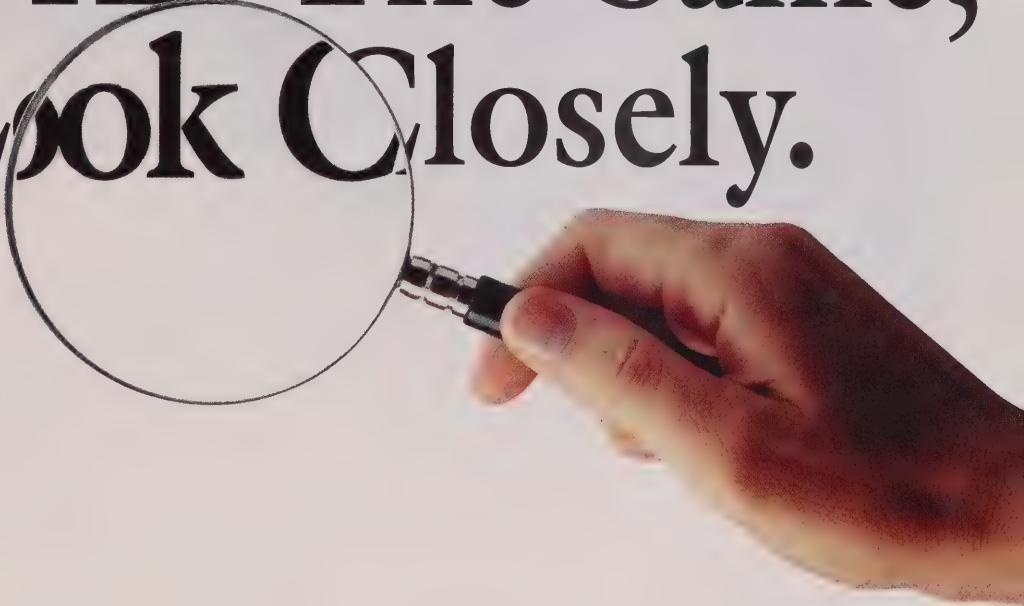
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